Engineering Library

MAR 3 1922

In This Issue—*Ten Ways of Selling Maintenance*

MOTOR AGE

Vol. XLI
Number 9

PUBLISHED WEEKLY AT THE MALLERS BUILDING
CHICAGO, MARCH 2, 1922

Thirty-five Cents a Copy
Three Dollars a Year

Ask 'Em To Buy

Champion-X — now 60c
Champion Blue Box now 75c

Over 40 Millions In Daily Use

At the above new prices, you will get a greatly increased demand and turn-over on CHAMPIONS, if you will put in a CHAMPION MERCHANDISER, display the new prices prominently in your window and store and "ASK 'EM TO BUY." Get behind this CHAMPION campaign and you will direct the entire neighborhood purchases thru your house and increase their confidence in you and get that extra volume of trade which has been going to gyps, catalog houses and other outside sources which have drawn trade from you by advertising your wide margin of profit.

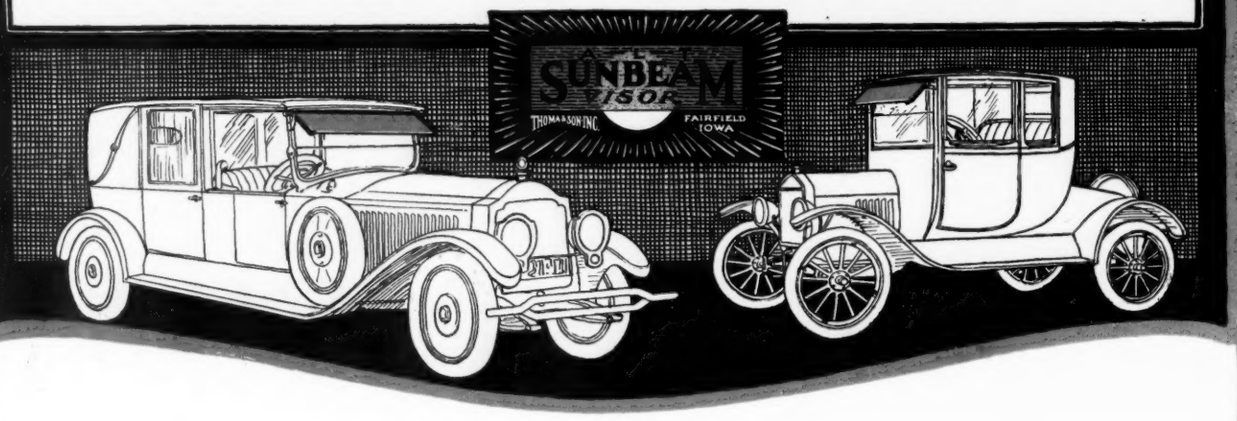
We are putting on the largest advertising campaign we have ever attempted, using display space in 91 newspapers, in 32 farm papers, page space in Saturday Evening Post and Cosmopolitan, window displays and road signs everywhere to insure you increased turn-over and increased sales to much more than make up for your slightly decreased per plug margin of profit. We depend upon this campaign, coupled up with the new prices, to produce vastly more actual total spark plug profits for you for 1922, but to get the results, you must

"Ask 'Em to Buy"

Champion Spark Plug Co. **Toledo, Ohio**

Entered as second-class matter Sept. 10, 1900, at the post office at Chicago, Ill., under Act of March 3, 1879.

HANDSOME ENOUGH IN DESIGN TO DRESS UP A $5,000 CAR—LOW ENOUGH IN COST FOR THE MAN WHO PUTS ECONOMY FIRST



THAT'S the beauty of this practical, handsomely built A-L-T Sunbeam Visor; it is a "class" product that enjoys a mass sale. Everyone who owns a car is your prospect. Its sales possibilities are practically unlimited because its quality, design and practical usefulness are entirely out of line with the low retail price of $16.

The Sunbeam is an exceptionally light grade glass Visor, made in amber and green. Fits any car in America.

The Sunbeam Dealer Co-operative Sales Plan

We are a great deal more interested in selling Visors **for** you than we are in selling them **to** you. Our volume depends upon repeat business from our dealers and the only way we can get repeat business is to provide a plan that will turn the merchandise quickly.

You will find our retail sales plan the most complete and most practical that has ever been offered to you to help you sell an automobile accessory — display stands, newspaper ads, letters and mailing folders, window posters, instruction sheets, booklets and folders, movie slides —every practical method of letting car owners know that you are the A-L-T Sunbeam Visor dealer in your territory.

Thoma & Son, Inc.,
Fairfield, Iowa.

Gentlemen: Please send us copy of your sales Prospectus and details of your dealer proposition on A-L-T Sunbeam Visor. The jobber through whom we buy is.....

.....

Signed .....

Address .....

Write for a copy of the Thoma Prospectus which outlines the entire sales plan. No obligation.

THOMA & SON-INC.
Everything in Glass for the Automobile
FAIRFIELD, IOWA

MOTOR AGE

Published Every Thursday by
THE CLASS JOURNAL COMPANY
MALLERS BUILDING
59 East Madison Street, CHICAGO

Vol. XLI Chicago, March 2, 1922 No. 9

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SUBSCRIPTION RATES

United States, Mexico and U. S. Possessions ..... $ 3.00 per year
Canada ..... 5.00 per year
All Other Countries in Postal Union ..... 6.00 per year
Single Copies ..... 25 cents
Subscriptions accepted only from the Automotive Trade

Entered as Second Class Matter Sept. 19, 1899, at the Post Office at Chicago, Ill., under Act of March 6, 1879.

MAKING PROFITS FOR DEALERS

Car owners know that carbon is responsible for 80% of their engine troubles. Thousands of people are keeping their motors clean with Johnson's Carbon Remover. This demand is creating profitable business for dealers who are prepared to supply it.

JOHNSON'S CARBON REMOVER

is a harmless liquid that contains no acid. It has no action on any metal and does not affect lubrication.

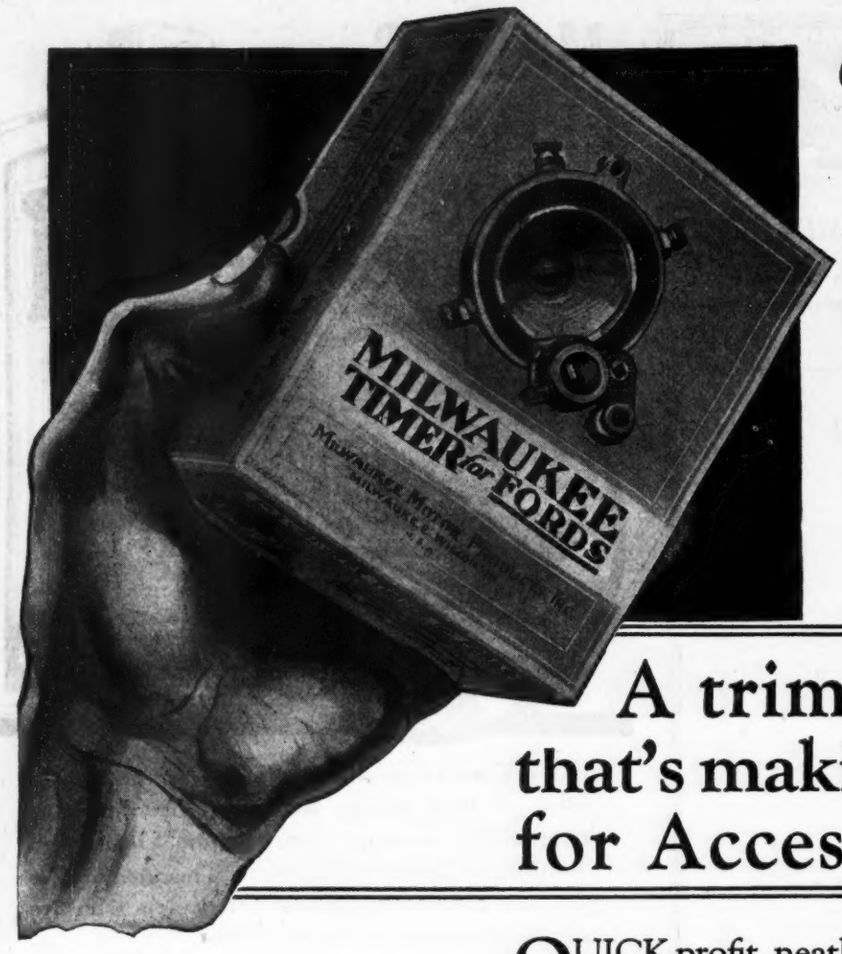
The use of Johnson's Carbon Remover every 500 miles keeps motors running quietly and full of "pep." A pint can will clean out a four cylinder motor twice. If necessary, the car owner can apply it himself.

You can make big profits and satisfied customers from a small investment in Johnson's Carbon Remover.

Write for our book on Keeping Cars Young—it's free. Tells how to reduce automobile depreciation with Johnson's Car Savers.

S. C. JOHNSON & SON

Racine, Dept. MA 2 Wisconsin



"The Cash Box"

A trim little carton that's making Big Money for Accessory Dealers

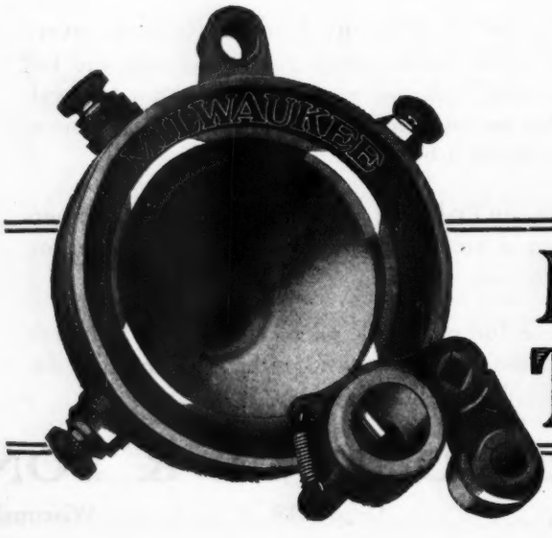
QUICK profit, neatly boxed—ready sale, handy stock, fast turnover—that's the *Milwaukee Timer!* Nice business, isn't it? No wonder you find *Milwaukee Timers* stocked and featured by nearly all progressive dealers everywhere.

Who wants to waste time trying to move un-advertised, un-asked-for timers when the demand is all *Milwaukee?*—when the biggest advertising backing ever given a timer is sending *Milwaukee* customers to the auto supply stores of America?

A *Milwaukee Timer* keeps a Ford smooth-running and efficient—free from ignition troubles for thousands of miles. Its hotter, more uniform spark gets the utmost out of the Ford engine—makes every cylinder do its best. That's why it outsells all other timers 3 to 1.

The Milwaukee Timer can and should be one of YOUR chief sources of profits. Order a supply from your jobber today—March, April and May are big timer months.

Milwaukee Motor Products, Inc.
(Formerly Milwaukee Auto Engine & Supply Co.)
Milwaukee, Wisconsin

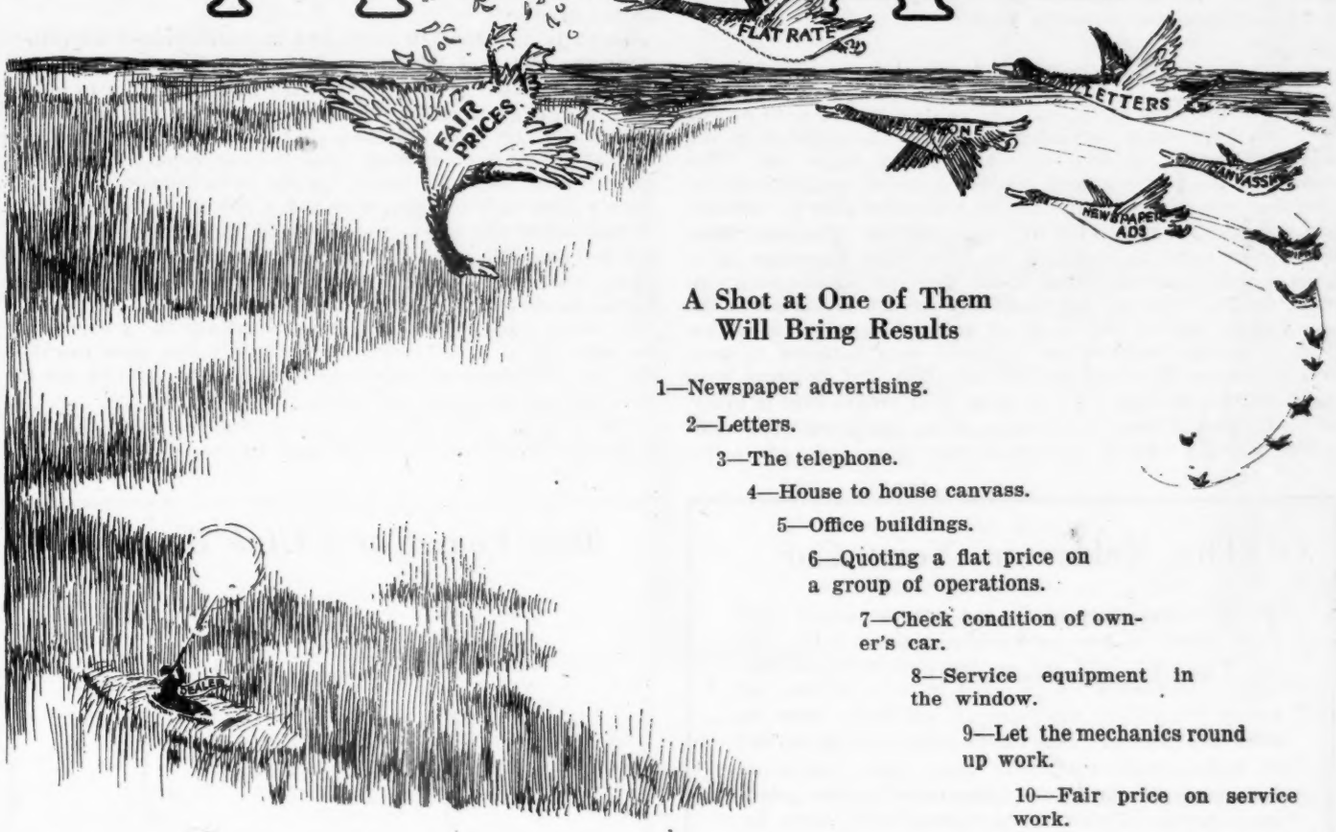


MILWAUKEE TIMER *for* FORDS

If you haven't a MILWAUKEE TIMER Steel Display Stand for your window or counter, write us for one. Lithographed in five colors—holds actual timer and brush assembly. FREE, POSTPAID, on request.

Vol. XLI No. 9 Chicago, March 2, 1922 $3.00 Per Year

MOTOR AGE



A Shot at One of Them Will Bring Results

1—Newspaper advertising.
2—Letters.
3—The telephone.
4—House to house canvass.
5—Office buildings.
6—Quoting a flat price on a group of operations.
7—Check condition of owner's car.
8—Service equipment in the window.
9—Let the mechanics round up work.
10—Fair price on service work.

10 Ways of Getting More Business Into the Maintenance Department

WHAT of the Service Station That Stocked Up Heavily with Machinery and Tools When the Going Was Good and Now Finds Customers Few and Far Between? There Is Business to Be Had—Much of it Will Not Come to the Service Station—It Must Be Brought in

RIGHT now there are a good many service stations in the country whose managers are walking through the shop looking over the idle machinery and wondering whence will come business.

Here is a pretty well planned shop and service building, there is a collection of the latest types of labor saving machinery, the men are good workmen and yet the shop does but a mediocre business.

On top of it all the dealer knows he has so many of the cars he represents in that territory, but he gets only the service work on a small percentage of them. He knows also from the sales of tires and tubes and motor accessories in general that people are using their cars. Their cars must need maintenance work, yet he does not get the business.

The mild winter in most parts of the country has caused many motorists to use their cars all winter. Then, too, the closed body, by virtue of its design, is helping rapidly to make motoring a year 'round proposition. Probably more cars have

been driven this winter than ever before. Yet many service stations complain of no business.

The one great problem, then, is to get more business into the shop. After talks with dealers, car owners and others, MOTOR AGE feels certain that those automotive organizations which complain of no business have not exhausted every possible source of revenue. There are too many automotive vehicles operated throughout the country to warrant a well-equipped service station running on a half time basis or even less.

There are, we believe, several good ways in which it is possible to get more work into the service station and make more profits for the dealers. For convenience we have classified these under the following heads:

Newspaper Advertising

ONE of the most direct ways of getting results is to put on an advertising campaign through such mediums as the local newspaper, printed circulars, postal cards, etc. The trouble in the past has been that much of this sort of material prepared sometimes by the dealer and sometimes by printers has not been the right kind for result getting. The chief thing to bear in mind in planning an advertising campaign is to have something definite to talk about. Generalizations about "efficient service," etc., do not make any particular appeal to the car owner. But if you speak of some feature in connection with a certain make of car which a man happens to own, you are more likely to get his attention and business than when you say all cars ought to have their brakes kept in order, or that wheel alignment is necessary for maximum tire wear.

For example, suppose you know that there are quite a few cars operating in your territory which have engines fitted with tungsten exhaust valves, a metal which is very hard. Very often the average car owner thinks he can do a pretty good job of valve regrinding, but he does not know the nature of the metal used in the valves. Consequently he will use old time methods—a little paste on the valve and seat and a screwdriver to oscillate the valve.

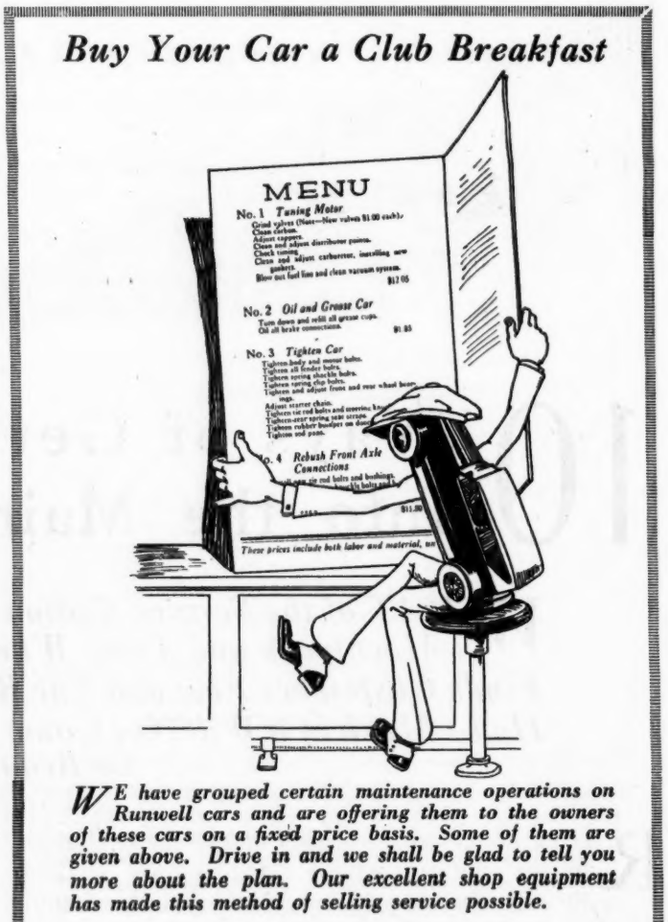
He does not know anything about reseating a valve properly and probably imagines that a service station cannot do the work any better than himself. There is a good chance to sell such an owner on your methods of doing this work, providing, of course, that your methods are in keeping with the latest approved practices.

There is a chance to point out in a newspaper advertisement the fact that the valves in such and such engines are made of tungsten or some other hard metal and that to insure best results, such valves must be trued up in a grinder. Advertise the fact that you have such a grinder. Put in a picture of the machine at work. Let the car owners in your territory know you have tooled up for their benefit. You may have a neat looking salesroom and a row of mahogany desks in your office, but unless you advertise the machine for grinding valves or line reaming bearings, how is the car owner to know what sort of a job he might expect from your shop, which he seldom sees?

It would seem that it is just as important for a car owner to know about a fine piece of machinery you have installed for the betterment of maintenance as it is for him to see the rugs and palms in the salesroom.

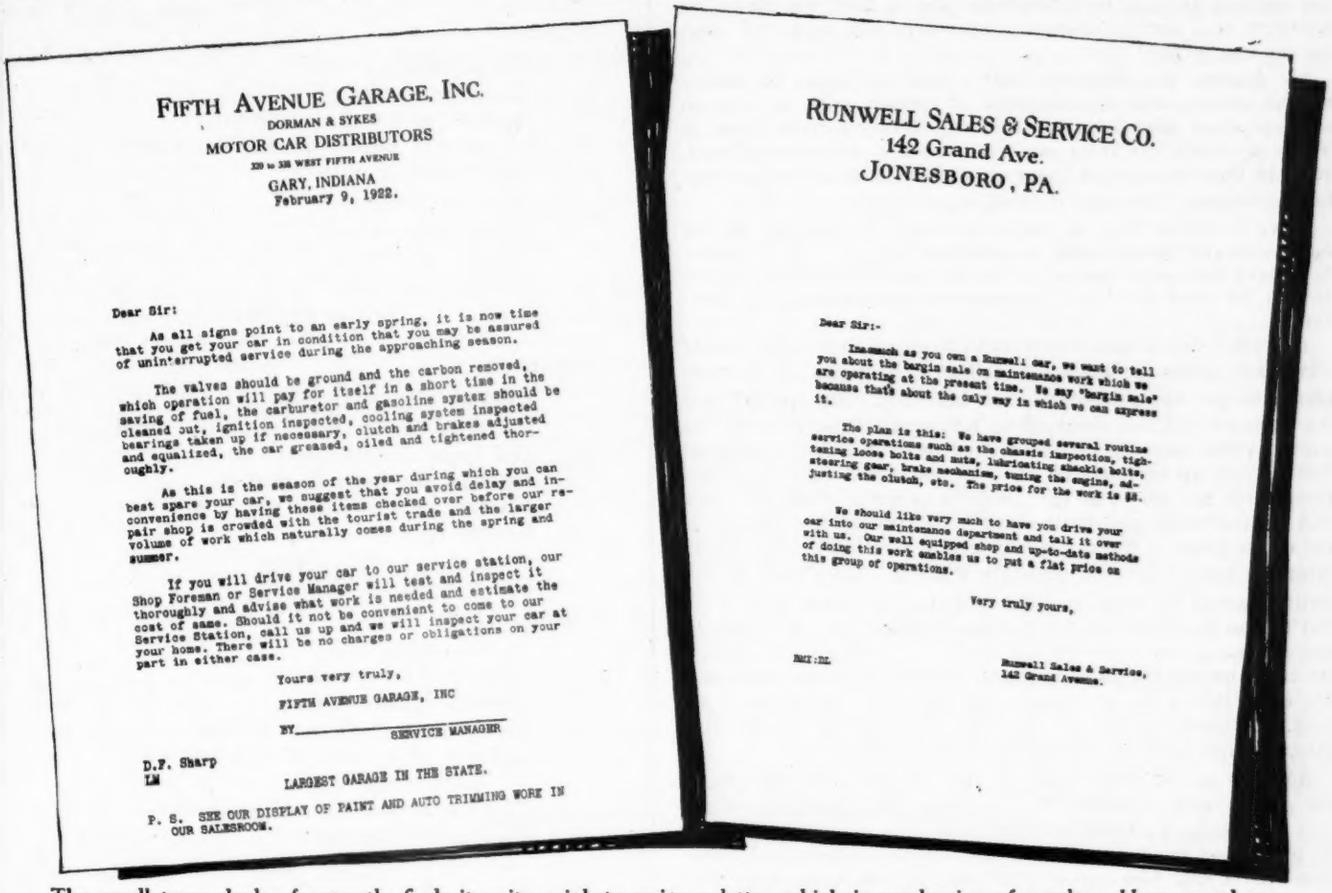
The driving public still is quite uneducated as to the wonderful strides which have been made in the last two years re-

The Valves in Your Car
THE valves, particularly the exhaust valves used in many of the automobile engines today, are made of very hard metal, tungsten, or otherwise. Many car owners try to grind in these valves, but unless the proper equipment is available, poor results will follow. The valves must have a perfect 45 degree angle seat. To insure these results we have in our maintenance department a valve grinding machine. This machine insures every valve being machined perfectly and an engine assembled with such valves will give the best performance possible.
Come In and See This Machine Operate. If You Are the Owner of a Runwell Car This Will Interest You Because the Valves in Your Engine Are Made with Tungsten Steel Heads.
Runwell Sales & Service Co.,
142 Grand Ave.


Buy Your Car a Club Breakfast
MENU
No. 1 Tuning Motor
No. 2 Oil and Grease Car
No. 3 Tighten Car
No. 4 Rebush Front Axle Connections
WE have grouped certain maintenance operations on Runwell cars and are offering them to the owners of these cars on a fixed price basis. Some of them are given above. Drive in and we shall be glad to tell you more about the plan. Our excellent shop equipment has made this method of selling service possible.
Runwell Sales & Service Co.,
142 Grand Ave.

Two samples of newspaper advertisements which can be used to advantage by the motor car dealer in securing more business for the maintenance department. Notice that in each case there is a definite message to the car owner

Letters Which Say Something Can Be Depended Upon to Get More Business



FIFTH AVENUE GARAGE, INC.
DORMAN & SYKES
MOTOR CAR DISTRIBUTORS
320 to 328 WEST FIFTH AVENUE
GARY, INDIANA
February 9, 1922.

Dear Sir:

As all signs point to an early spring, it is now time that you get your car in condition that you may be assured of uninterrupted service during the approaching season.

The valves should be ground and the carbon removed, which operation will pay for itself in a short time in the saving of fuel, the carburetor and gasoline system inspected cleaned out, ignition inspected, cooling system inspected bearings taken up if necessary, clutch and brakes adjusted and equalized, the car greased, oiled and tightened thoroughly.

As this is the season of the year during which you can best spare your car, we suggest that you avoid delay and inconvenience by having these items checked over before our repair shop is crowded with the tourist trade and the larger volume of work which naturally comes during the spring and summer.

If you will drive your car to our service station, our Shop Foreman or Service Manager will test and inspect it thoroughly and advise what work is needed and estimate the cost of same. Should it not be convenient to come to our Service Station, call us up and we will inspect your car at your home. There will be no charges or obligations on your part in either case.

Yours very truly,

FIFTH AVENUE GARAGE, INC

BY_____ SERVICE MANAGER

D.F. Sharp
LM

LARGEST GARAGE IN THE STATE.

P. S. SEE OUR DISPLAY OF PAINT AND AUTO TRIMMING WORK IN OUR SALESROOM.

RUNWELL SALES & SERVICE CO.
142 Grand Ave.
JONESBORO, PA.

Dear Sir:-

Inasmuch as you own a Runwell car, we want to tell you about the bargin sale on maintenance work which we are operating at the present time. We say "bargin sale" because that's about the only way in which we can express it.

The plan is this: We have grouped several routine service operations such as the chassis inspection, tightening loose bolts and nuts, lubricating shackle bolts, steering gear, brake mechanism, tuning the engine, adjusting the clutch, etc. The price for the work is $8.

We should like very much to have you drive your car into our maintenance department and talk it over with us. Our well equipped shop and up-to-date methods of doing this work enables us to put a flat price on this group of operations.

Very truly yours,

RMH:RR

Runwell Sales & Service,
142 Grand Avenue.

The small town dealer frequently finds it quite a job to write a letter which is productive of results. Here are shown two letters one of them having been used to good advantage by an Indiana dealer

garding the equipping of shops and service stations for selling better service. The fact has not been advertised enough. Car manufacturers are spending much money calling attention to the better design and construction of motor cars and some of them are going so far as to point out the maintenance features of their product. It is logical, therefore, for the dealer and distributor to advertise the better service facilities they have for taking care of these cars.

As a possible help for the dealer we offer the following suggestion for his newspaper advertisement:

If you now are running an ad something like this:

Runwell Automobile Company,
Runwell Cars Carryall Trucks
Expert Repairing
All Work Guaranteed
Tel. Main 105 21 Grand Ave.

by all means change it. Like a famous cartoonist says: "It doesn't mean anything." There are thousands of these ads running and you generally will find they do not produce much business. And the reason is plain. In the first place the people of your community know the name of your company if it is in a small town. They know there is a Runwell car and a Carryall truck. Expert repairing is a term much abused and has little value attached to it. The same is true of all work guaranteed. Then the telephone number. Unless a customer is broken down he won't call you up. It would be better for the dealer to call him up. Street numbers are like Topsy, they "just grew up" with advertising and probably always will be necessary.

In place of such ads which long ago have outlived their usefulness, something like the ad shown on these pages describing the valve grinding machine could be run to advantage. Every dealer or operator of a service station in a few minutes time can check over his machinery and tool equipment and pick out the salient features of each for presentation to the customer. Costly machinery standing idle in the shop is as great a liability these days as the used cars. But, the dealer has a better chance to put the machinery to work and the right kind of newspaper advertising will help to do it.

Letters

WHAT has been said about newspaper advertising applies equally well to letters and circulars which are mailed out to car owners. One of the best things about advertising by circulars is that the sender is able to pick out a preferred list of prospects and therefore make a direct appeal to them. If the dealer has a large number of cars of the make he is handling out in his territory then probably the best plan is to first direct all his advertising or appeal by mail to the owners of these cars.

As in the case of the newspaper advertising, be sure that the circulars sent out have something definite to say. Make the car owner a direct proposition of some kind. If he is not in a mood to buy a new car, go after the car he has. It certainly needs maintenance work and if your service station is not the best equipped in the territory to sell him the right kind of service on that make of car, then, you as a dealer and operator of a service station have no right to expect the owners of such cars to drive into your place of business for service.

If you contemplate using letters to car owners in your territory or in the surrounding towns be sure to have your return address on the envelope, so that if the letter is not delivered within a few days you will get it back and in this way you will be able to keep your mailing list "alive."

Some suggested forms for circulars and letters are shown on these pages.

The Telephone

THE quickest way to get more business into the service station is by way of the telephone. Of course, he wants his patrons to call him, but why should not the dealer or operator of a service station just reverse the trick and call up the car owner?

We venture the statement that a half day spent in calling up car owners will be productive of enough work to keep an average sized shop busy for a week. Every square block in a city probably has from one to a dozen or more motor cars, some of them being used every day, others laid up for the winter, or because they are in need of repairs.

Now, if the owners of these cars can be reached on the telephone and intelligently approached, there is good reason to believe that some business is to be had out of every square block. To show what can be done we cite the following incident:

The other day a dealer in a small town of about 2000 people was asked about the subject of calling car owners on the telephone to get more business into his shop. He replied that the thought had not occurred to him and maybe it would be worth trying out. A representative of MOTOR AGE suggested that he call up someone he knew owned a car right then and there. He did so. The car owner was quite willing to talk and it soon developed that he had some trouble with the shifting of the gears in his car, a car several years old. The dealer informed him as to what probably was the matter and the car owner agreed to bring the car into the shop two days later. But it also developed during the conversation that the radiator had sprung a leak recently and needed repairing. And, to top the thing off the car owner in closing said that there might be a few other things the car needed and the dealer could look it all over. So there was easily $15 worth of business in five minutes, secured without moving out of the office chair.

Recently a car owner told us that his car was laid up in his garage with a broken front spring. He knew, of course, that eventually he would have to take it to a repair shop, but he mentioned the fact that if some service station representative would call him up or visit him at his home he would gladly give them the job and in addition probably tell them to tighten the shackle bolts, body bolts and a half dozen other things. But, you ask, how would any service station know about his car's condition? And that brings us to another method of getting more business into the service station—the house to house canvass.

House to House Canvass

PROBABLY when the suggestion of a house to house canvass is made many will shrug their shoulders and say it can't be done. But it can be done. One motor car dealer used this method last fall to sell new cars and he was successful. It is done in many other lines of business, piano tuning, electric washing machines, etc. What is easier than to spot a garage back of a man's house and get in touch with him about it?

The dealer might have one or two good salesmen well qualified to go out and meet the public and who may be well enough versed in the mechanical construction of cars to be able to solicit repair work. If they cannot sell a man a new car they might at least sell him some service work on the old car.

Many car owners like to tinker around with their cars and if such owners can be shown that it is to their advantage to have their cars looked over and repaired by a competent service organization, it is not going to take much persuasion to sell them on the idea. Much of the same kind of talk as that used in the advertisement of the valve grinding machine can be used to advantage by the service salesmen who make the house to house canvass. The term house to house in this case means, of course, only those houses which have garages back of them.

The salesmen may get a good tip from the lady of the house. She may say that she has trouble when she drives the car because it steers hard. Perhaps her husband does not mind this. The facts in the case may be that the steering gears need to be checked over and possibly the wheels aligned, new bearings fitted or something similar. At any rate the salesman can immediately get in touch with the man who owns the car and make him a proposition.

Selling Group Operations at a Flat Price

Group No. 1—

Grind valves
Clean out carbon
Adjust push rod clearance
Clean and adjust distributor points
Check timing
Blow out fuel line
Clean vacuum tank
Adjust carbureter
Change oil in engine

Price 14.50

Group No. 2—

Change oil in engine
Turn down all grease cups and refill
Oil brake connections
Change lubricant in gearset
Change lubricant in rear axle
Grease springs

Price 8.50

Group No. 3—

Tighten body bolts
Tighten fender bolts
Tighten spring clips
Tighten steering connections
Take up plan in front and rear wheel bearings
Tighten engine hold down bolts
Tighten shackle bolts

Price 7.00

By grouping several service operations and selling them at a flat price, many dealers have succeeded in keeping the shop busy. Above are several suggestions as used by some maintenance departments

Office Buildings

IN THE larger cities there is very good opportunity to call on business men in their offices. Practically the same methods as those used in a house to house canvass can be used in this case. A man may have a car at home in his garage which needs repairs of some kind and he probably has put off having the work done until he finds time to attend to it. He may be contemplating a trip out of town and so does not care particularly when the work is done. The service salesman may be able to reach him at just the right time.

The salesman may even offer to get the car from the man's garage or have a man from the service station do it. There is also the opportunity present of making the man a proposition whereby the service station will make a thorough inspection of his car for so much money. The owner then will have a record of the needed operations and if he does not have them all done at one time, he will be constantly reminded of those left undone until some day he will authorize all of them.

If a man knows he is driving around with a tie rod that needs rebushing he is pretty sure to feel worried every time he goes over a rough road and sooner or later he will drive into the service station for new bushings. He may not know there are such things as bushings in the front axle, but the inspection report tells him something is wrong and as long as

he knows something is wrong with his car he will be reminded of it as long as he drives it in that condition. Along with the selling of service to the business man, mention might be made here of the plan of quoting him a flat price for a group of operations.

A Flat Price for a Group of Service Operations

SINCE cars are driven pretty much the year round, the term "spring overhauling" has gotten to be a thing of the past. Nevertheless, a car driven all winter is subjected to severe conditions and some sort of an "overhaul" is almost necessary to put it into condition for spring and summer use. Ice, snow, water and cold temperatures play havoc with many of the parts and a car is neglected much more in winter than at any other time of the year.

Therefore, the dealer or service station might get together a group of service operations on the more popular makes of cars in that territory and then quote a man a flat price for them. For instance, tell him that for $50 he can have the engine bearings taken up, clutch adjusted, wheels lined up, shackle bolts replaced, springs lubricated, chassis tightened, new lubricant put into gearset, axle, universal joints, etc., etc. As long as he knows just what is going to be done to the car and the price of it, he is very apt to tell the salesman to go ahead on the job. Many service stations in the past have cashed in on this sort of a proposition.

Checking Condition of Owner's Car

IT IS well known that a periodic inspection of a motor car, truck or any other automotive vehicle will forestall many heavy maintenance costs. An automotive vehicle operates under all sorts of conditions and the unexpected is likely to happen at any time. Many a car owner does not know he is driving around with loose spring clips, loose shackles, loose wheel bearings and similar things until he breaks a spring or does some other damage.

Records seem to show that few systems of periodic inspections of owners' cars by the service station are successful, principally because it is exceedingly difficult to get the owners to drive to the service station. The inspection may be free and all that, yet it seems people will not take advantage of the inspection. If this be so, then it would seem logical for the dealer to go out and inspect the cars wherever they can be found.

In one of the large Western cities a truck company sends out a man on a motorcycle and whenever he spots one of the company's trucks at rest, he dismounts and gives it an inspection and sends the report to the owner of the truck. The result is the most of these trucks are giving good service because as soon as the owner gets the report he feels inclined to send the truck to the service station for necessary repairs.

Another dealer is doing much the same thing with the owners of cars he is handling. When one of his men finds a car at the curb he gives it an inspection, superficially, of course, and then waits until the owner comes around to drive the car away. The owner is told of the excellent service facilities at the service station and generally sold on having the car looked over and put into shape. In both cases mentioned above, it will be noted that the owners are gone after. The dealer does not wait until the car owner drives to the service station, generally from necessity.

There is another idea which some service stations have worked out with apparent good results. In this instance a man goes about the town and on every private garage door tacks up a small inoffensive sign calling the car owner's attention to several maintenance operations on his car. For instance, the sign may ask if the owner has had the springs of his car lubricated recently, if not Blank's service station will do it for so much money. The card might list a few of the service operations which the company will do for a flat price, etc. One thing to remember is to use but one tack and put it in loosely. The idea is that the car owner will spot the sign as soon as he drives in and will probably remove it as soon as he has finished reading it. In fact, he may want to put it into his pocket as a reminder.

Put a Machine in Your Window

ONE time we saw a cylinder regrinding machine operating in the salesroom of a dealer's establishment and upon investigation found the reason for his doing this was that he attracted a great amount of attention and what is still better got a great deal of service work.

He had invested a considerable sum of money in this machine and knew of the excellent work it would do, but he thought one of the quickest ways to let customers and prospects know about his equipment for rendering good service was to let them see the machine in operation. When the people saw the cylinder bores nice and shiny and a set of new pistons laying alongside, those who were driving old cars

CAR INSPECTION REPORT

We Have Inspected Your Car. The Items Checked Need Attention

1—Test front wheel bearings		18—Inspect battery terminals and battery	
2—Test front wheels for alignment		19—Inspect battery clamps	
3—Inspect engine holding down bolts		20—Inspect all electric connections	
4—Inspect and oil hood fittings		21—Inspect gasoline tank	
5—Inspect and oil hood sills		22—Inspect rim bolts	
6—Inspect and oil all fender bolts		23—See that foot and hand throttles open and close carburetor	
7—Inspect windshield anchor bolts		24—See that fan belt is tight and pulley oiled	
8—Inspect instrument board bracket bolts and screws		25—Test gasoline line for leaks	
9—Test clutch for grabbing and slipping		26—Test horn	
10—Inspect torque arm and fill oil cup		27—See that generator is charging and oiled	
11—Adjust clutch control lever and thrust bearing		28—See that distributor points are set properly	
12—Inspect transmission		29—Test brakes	
13—Inspect universal joint		30—See that pedals clear floor boards	
14—Inspect spring shackle bolts		31—See that all lights operate	
15—Inspect steering gear		32—See that doors open and close freely and that latches operate	
16—Inspect differential		33—Test valves, ignition and carburetion	
17—Inspect brake levers and clevis pins			

Much business can be had as a result of giving a customer's car an inspection. A chart like the above can be used to advantage. When filled out it tells the customer the condition of his car

began thinking of the engines in their cars and the natural result was that they drove around and ascertained prices and other factors.

After he had built up a good reputation for service work the dealer placed the machine back in the shop. At another time he will take some other machine used in his service work and place it in the window. The essential thing is that the machine must be operating.

Let the Mechanics Go After Service Work

THERE is one dealer who gets business into his service station because he has one of his mechanics out much of the time calling on farmers and rounding up repair work. This mechanic possesses enough sales ability so that he intelligently can sell service. He takes out the service car and occasionally tows in a car which is in such shape that it cannot be driven under its own power. The farmer hesitates getting it to town but when the service car is there and the mechanic talks repairs the farmer generally is willing to let the man tow the car to the service station. The man also does minor repair jobs to cars or tractors right on the spot.

As long as there are idle men in the shop it seems that some sort of a proposition could be offered them whereby they got a certain per cent on the work they steered into the shop. Certainly if a man is alive he will prefer this to being idle and see his job jeopardized.

A Fair Price for Repair Operations

THERE are still many dealers operating in the smaller towns on a war time basis. They have stuck to the $1.50 or $1.25 per hour charge to the customer for service work, whereas, $1 would probably be a far more equitable charge. In a small town, overhead naturally is smaller than in an industrial center, because in such a center everything, rents, light, heat, etc., are higher and the dealer or any other business man has a right to figure on a larger overhead.

Only recently there has come to hand information showing that there is a growing tendency in practically all sections of the country for a reduction in the price of labor on service work. Dealer organizations and individuals are behind these movements. The lowering of prices are directly in keeping with the reduction in prices on other commodities especially within the last year or so.

By all means let the dealer or operator of a service station hand the customer an itemized bill just as soon as the repair operations have been finished. This should state clearly the cost for labor and parts.

You will get a crowd in front of your window by placing a machine in it. This helps acquaint the owner with your shop equipment and other facilities for rendering good service

And, by all means, must the dealer figure in his own margin of profit.

This may sound ridiculous, but it is amazing these days to find how little the average small town dealer knows about his profits and losses. In other words, if you want more business to come into the service station you must make sure that there is system in keeping of records. The dealer must know at all times where he stands.

Mechanical departments of a great many of the larger service stations over the southeastern territory have announced reductions during the past month in service charges, due to a general lowering in wage scales of mechanics and other service station help. In some cases hour labor charges have been reduced as much as 33 1/3 per cent, and in about the same ratio where the flat rate policy is in vogue. In other cases the reductions have been around 20 to 25 per cent.

Some of the more important flat rate prices now in vogue in this section generally at leading Ford service stations, as compared with old prices, are as follows:

	Old	New
Overhauling engine and transmission	$25.00	$16.00
Overhauling engine only	22.50	14.00
Overhauling transmission or magneto	14.00	8.00
Installing one piston or connecting rod	4.50	3.00
Grinding valves and cleaning carbon	3.00	2.50
Overhauling rear axle	7.00	4.00
Overhauling front axle	6.00	4.00
Overhauling steering gear	3.00	2.25

The reductions in hour labor in many cases have been from $1.50 per hour to $1.00 per hour.

GARDNER FINANCIALLY STRONG

St. Louis, Feb. 27—The balance sheet of the Gardner Motor Co. as of Dec. 31 shows the company in a strong financial position notwithstanding the substantial loss taken during the year on inventories and increased overhead resulting from small production. The company has no current liabilities except dealers' deposits amounting to $23,448. Cash on hand amounts to $514,180, accounts receivable $244,238, and inventories, at cost or market, to $519,604.

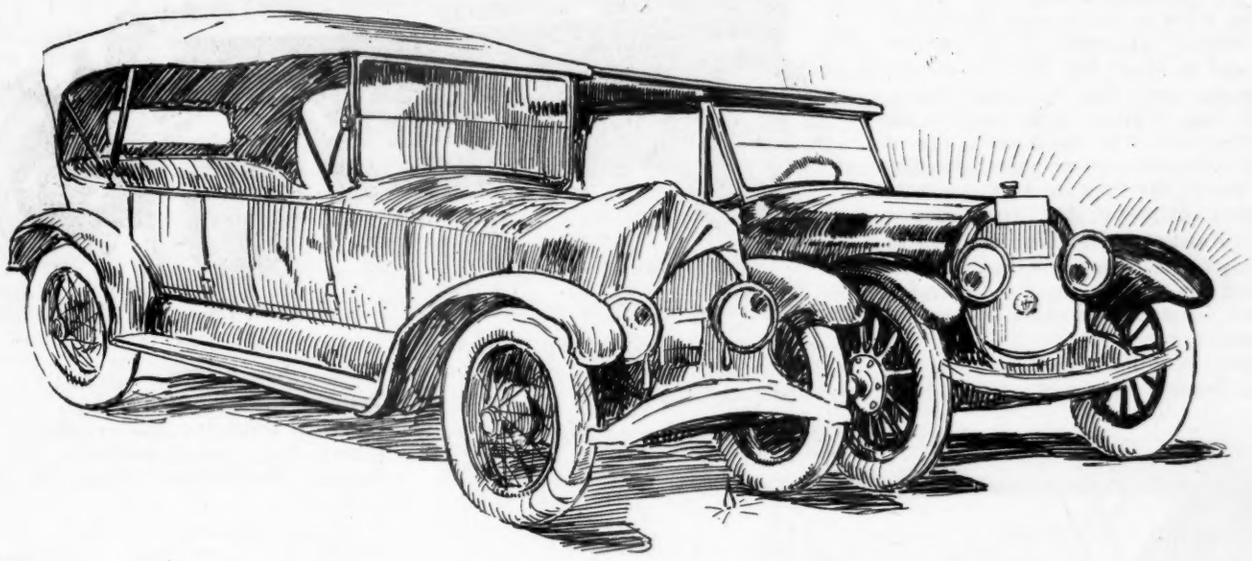
The report to stockholders states that since the price of the company's touring car was reduced to $895 sales have been greatly stimulated and many new dealers have been added.

MILTON ENTERS FOR RACE

Indianapolis, Feb. 27—Tommy Milton, the 1921 A. A. A. champion driver and winner of the last Indianapolis 500-mile race, has filed his entry for the 1922 five-century at Indianapolis May 30. The much titled driver has nominated the eighth car for the race and will carry number eight, the number which gave Joe Dawson and the National a victory in 1912.

In making his entry Milton has not disclosed the make of car he will drive in the coming race. After he won the last 500-mile with Louis Chevrolet's eight cylindered Frontenac, he turned his attention to the Durant Special, which was not completed in time for the Hoosier classic, and, finishing out the season with this car, won the championship. The car was constructed by Harry Miller, the Los Angeles engineer, and is a very fast car. It is possible that Tommy may drive this car in the 500-mile but he may have a new mount for 1922.

As Car to Car



First Car

GEE! I sure am feeling fine!
Full of pep, and how I shine.
Been overhauled in an honest shop
From axle-bolts to mohair top.
Not a rattle—nary a squeak,
'N the whole durn job took less'n a week!
Pile in, son, I'm goin' to show
I'm fit's a fiddle—c'mon—let's go!

-:- -:- -:-

Second Car

RATS! No! I tell you, I feel punk!
I'm four warped wheels and a pile of junk.
I should be all fixed up inside
So my boss and I can ride and ride
And not get stalled along the road,
It seems we're *always* being towed.
I'm all fed-up with being mauled;
Tell me where you were overhauled.

-:- -:- -:-

First Car

THERE'S no use shedding any tears,
You'll soon be sound from clutch to gears.
Just take my card to this friend of mine.
His shop is Front street, 2-2-9.
He'll look you over, give sound advice,
And then will quote a fair, flat price
For putting you in tip-top shape.
So you may laugh and "can" the crape.

A FEW DAYS LATER

Second Car

YOU have the dope on that mechanic;
He found my troubles were organic;
But he's equipped, his place is light,
He did my job, and did it right.

-:- -:- -:-

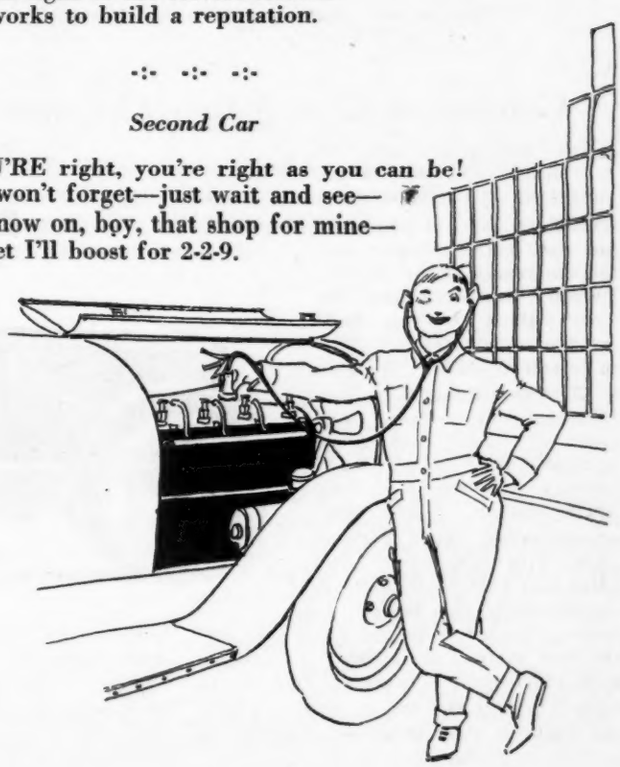
First Car

YOU look and sound as good as new,
And now I think, if I were you,
I'd stick tight to the service station.
That works to build a reputation.

-:- -:- -:-

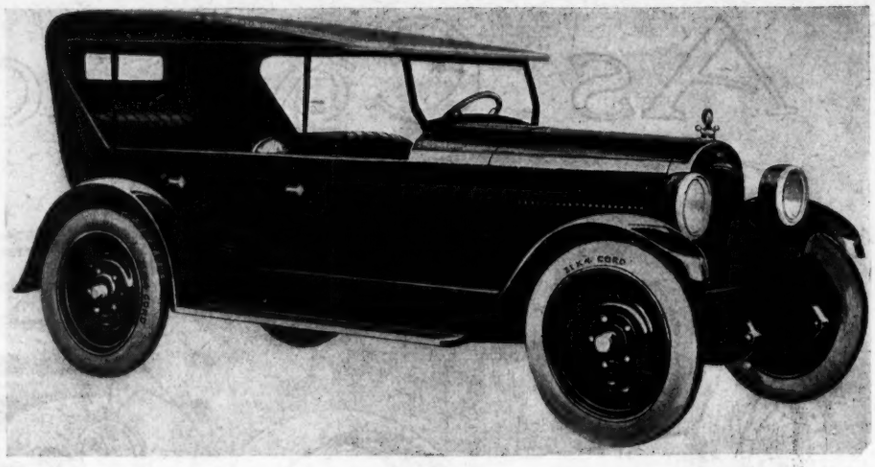
Second Car

YOU'RE right, you're right as you can be!
I won't forget—just wait and see—
From now on, boy, that shop for mine—
You bet I'll boost for 2-2-9.



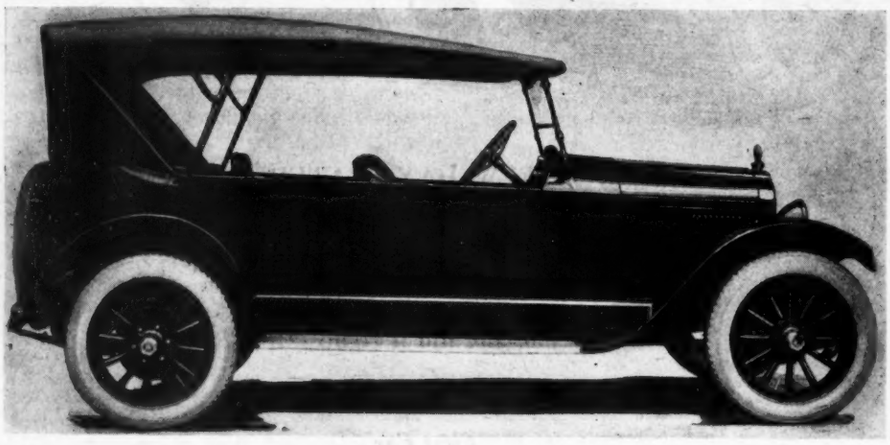
Davis Phaeton

THE model 71 Davis Phaeton, a smaller and lighter six-cylinder car than the present Davis models, will make its appearance March 1, with a price of $1195 at the factory, Richmond, Ind. This car was shown at the Chicago show and is fitted with the Continental 6-Y engine and, like the other Davis models, has Timken axles and Delco electric system. The wheelbase is 114 in. and the complete car weighs about 2500 lbs. One of the features of this car is the wheel equipment, five Disteel wheels being furnished as regular equipment. The body and wheels are finished in dark blue and the fenders, hood and splasher in black enamel. The sedan will be announced later.



Engine, bore and stroke, 3⅛x4¼ in. 50 horsepower at 2600 r.p.m.; full pressure lubrication; pump cooling; Delco starting, lighting and ignition; Stromberg carbureter.

Axles—Timken, front and rear.
Clutch—Borg & Beck.
Transmission—Warner.
Universal Joint and Shaft—Peters.
Frame—6-in. channel section.
Springs—Semi-elliptic, front 35 in., rear 52 in.
Upholstery—Leather.
Windshield — One-piece, rain-proof type.



New Willys-Knight seven passenger model

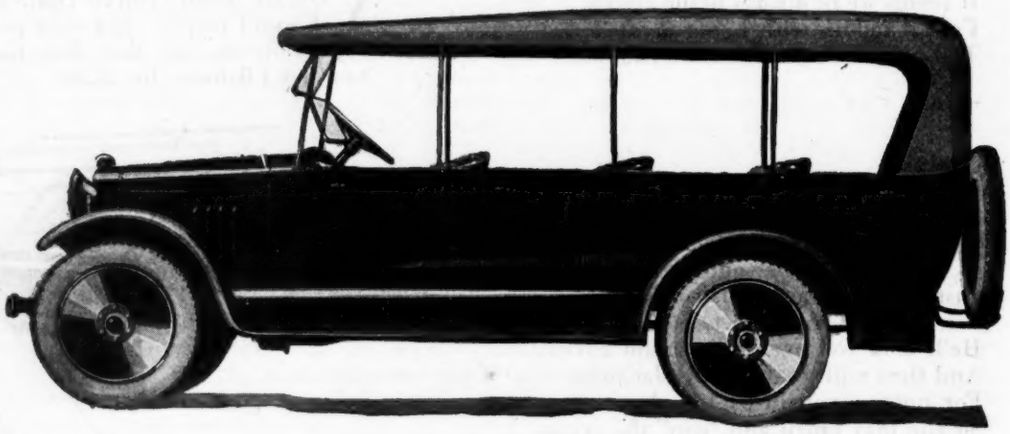
The new Willys-Overland car has a 124-inch wheelbase and uses 32 by 4½ inch tires. The hood design follows the lines of the five-passenger Willys-Knight. The power and transmission plants are those used in the Willys-Knight models now in production. The gear ratio is 5⅛ to 1

D. & B. Timing Gears

THESE timing gears are made of vulcanized fabric with impregnations of synthetic gum. They are so constructed as to cause a deadening effect upon the mating gear of metal and thus produce a front end drive for engines which will remain silent in service. The D. & B. gears are being quite generally used to replace worn or noisy gears when engines are overhauled. Marmon, Nash, Mitchell, Stutz, Franklin, Oldsmobile, Oakland and several other makes of cars now use these gears as regular equipment in their engines.

Commerce Char-A-Banc, Accommodating Ten Passengers and Driver

FOR city and suburban "jitney" transportation, motorized stage routes, sightseeing enterprises and depot and hotel transfer car, the Commerce Motor Car Co., Detroit, has developed the Char-A-Banc having seats for ten passengers and driver to sell at $2350. The body is of streamline design, lines blending with hood and radiator. Full size seats equipped with Marshall springs, upholstered in long grain leather. Three seats accommodate three persons each, with exit doors. The third seat back is divided, accommodating two people, division aisle allowing exit from this seat via door of rear seat. Body is equipped with two sets of curtains. One set of storm curtains for use in warm, inclement weather. The other set is equipped with crystal glass, constructed to open with doors for use in cold or winter weather. The top is of permanent construction and can be removed as an entire unit, or folded back. Color, body finished in royal blue with gold striping; wheelbase, 127 in.; gage, 56 in.; wheels, Michelin steel disc; front and rear tires, 35x5 pneumatic non-skid cords; motor, Continental Red Seal, 3¾x5.



Getting Live Used Car Prospects by Letting the Public Make Bids on Bargains Offered

W. PITT BARNES, head of the Barnes Motor Co., distributor of Dodge Brothers cars in the Cleveland territory, is the first dealer in this city to put into actual and complete operation the theory that the used car business is a separate and distinct enterprise and can not reach its highest stage of efficiency if it is made but a side line to the new car department.

Barnes looked about and saw any number of exclusive used car dealers that had been in business for several years. He decided if they could run such a business he could also. So he rented a show room on automobile row and equipped it in a manner that compares favorably with many of the exhibition rooms of new car dealers. There are two complete departments that are today filled with nothing but used cars.

Although he has a complete corps of salesmen in the big structure in E. 21st street, the men in charge of the Euclid avenue store are a separate organization. They keep their own accounts, their own records and talk nothing but used cars; of course, they never hesitate to place special emphasis on a new Dodge if they find they have gone the limit with a visitor to the Euclid avenue store and have not been able to land him.

In opening this store, Barnes adopted a novel procedure that has given his new establishment extraordinary publicity and has brought it to the front with a bang.

Competitive Bidding by Public

He adopted the policy of enabling prospective purchasers of used motor cars to do their own appraising of the models. On the opening day a Dodge touring car of the 1919 vintage was offered for sale at competitive bidding. In the newspaper advertising, the specifications of the used car that was offered were set forth. The public was asked to call at the show rooms, examine the car and then submit bids. It was announced that the car would be sold to the person who bid the highest.

The public accepted the invitation. One hundred and fifty persons submitted bids on that first car. One hundred and fifty prospects for used cars were obtained at once. No dealer in Cleveland but the Barnes agency knows who those prospects are. It is a fine list to turn over to salesmen. And the Barnes agency did that the very next day after all bids were in. Some of these prospects have bought new cars. Others have purchased used cars.

Barnes says that he never tried anything that turned up so many prospects for cars. He continued this policy of putting up for competitive business one used car each day. In all, seven cars were put up. Interest in the sales increased as the days went by. More than 1000 prospects were obtained—that is, more than 1000 bids were received on the cars.

Barnes went into the scheme with the idea that he could afford to make a sacrifice now and then on the cars offered, if he would get enough prospects.

But he learned that the public is fair, generally.

He figured that the first Dodge touring car that he offered for sale should bring at least $500. The highest bid was $515. Prices obtained for the other cars were close to the estimate of value made by the company.

Each of the seven cars were placed on exhibition and visitors to the show room had an opportunity to look it over and to place their own value on it. There was no value placed on the car by the company. Each bidder was given a blank, as follows:

Barnes Motor Co.:

Please enter my bid of $..... for the Dodge touring car now on display in your salesroom. Said car to be awarded to the highest bidder at 6 p. m. Friday, Jan. 13, 1922.

If my bid is successful, I agree to pay either all cash or 50 per cent cash and balance in not more than six monthly installments with usual charges for interest, insurance and brokerage.

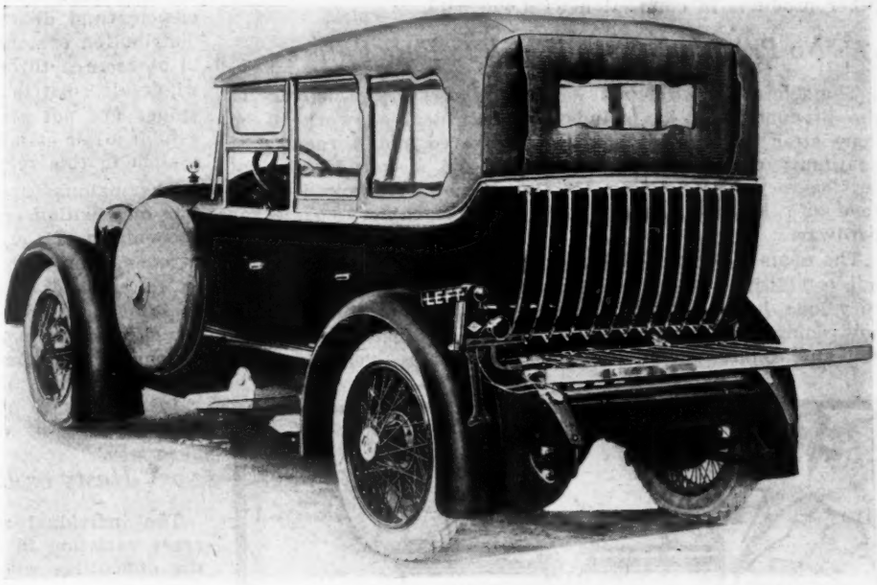
Name .....

Address .....

Telephone .....

This was filled out and deposited until the specified time for opening bids.

In addition to gathering up a nice bunch of prospects, the plan brought hundreds of visitors to the show room, who, otherwise, would not have entered.



Leach Engine Has Many Novel Features

INTEREST in the new Leach 999 centers chiefly about the powerplant. There are some features in the engine which will appeal to service men in particular. Accessibility has been one of the keynotes in designing the engine. For instance, it is possible to remove the pistons either through the top or bottom of the cylinders. The main bearings, including the rear bearing, are readily accessible through the removal of the crankcase.

The camshaft is placed overhead and operates the valves through fingers whose function is to eliminate side thrust from the valve stems. To eliminate periodic vibration and noise, double valve springs are used. The diameter, length and stiffness of each spring is different, therefore they cannot have the same period of vibration, or, in other words, they are non-synchronous. The valve mechanism is entirely inclosed and the fingers are provided with adjusting screws readily accessible by removing the side plates of the finger housing.

The starting motor and generator are placed on the gearset, with no wires exposed. These units are so placed that when the carbureter is disconnected the gasoline will not come into contact with any wires.

Distributors *or* Factory Branches?

Rapid Growth of Automotive Merchandising System Has Given Little Opportunity for Development of Settled Policies—Variation in Dealer Efficiency Important Factor

PART II

By HARRY TIPPER

IT IS necessary to emphasize the rapid growth of the automobile business in order to indicate properly the reason for the present condition in the distribution system. In all new and rapidly growing businesses there is a great flux and change among individual concerns, whether in the manufacturing or the distribution end.

This is particularly true of all the elements involved in the distribution and sale of automotive products. Although there are today 66,000 dealers in the field who have some influence upon the distribution of products, only a very small number of these have been in that business more than ten years, and a majority of them much less than that length of time.

With this rapid influx of new concerns into the retail and wholesale distribution of automotive products there has not been any time or opportunity to bring this distribution system into any settled policies or settled methods of doing business. This is true of the car dealer as it is true of those handling other products in connection with the field.

No Precedent Upon Which to Base Future

The sale of an automobile does not end with the delivery of the product itself—it includes a great deal of work to be done after the product has been delivered and it requires a continuity of contact, a competence and a consideration of service very different from the line of contact required in the case of the man selling household machinery or other hardware.

The contact between the user of the automobile and the retail establishment selling the cars has not been established very long in most cases, because a majority of the concerns now doing business entered this field less than seven years ago and a large number of those less than five years ago.

While a good many of these may have been connected with the automotive business in some way or another before, they were not intimately associated by long experience with the detail problems involved and they have not been able, up to the present time, to settle down into a regular policy of operating their business which would permit the manufacturer to depend upon certain efficiencies and to recognize certain difficulties to be generally considered.

While it is true that these retail establishments are all concerned with the sale of cars, they are not yet welded together in a common occupational body with common traditions and methods of operation. Under the conditions it would be impossible to expect this, and the manufacturer's calculations must be affected by that consideration.

The functional values of the wholesale establishments dealing in cars and the retail establishments similarly dealing in the sale and maintenance of cars are not altered by the inefficiencies and difficulties involved in the present state of the distribution system. If there are certain fundamental values to be secured through the distribution of cars from factory to wholesale distributor—to retail dealer—these fundamental values are not altered because the present concerns do not exhibit a fair standard of efficiency all through the distribution system in this respect.

The manufacturer of automobiles, therefore, must consider this distribution problem from two points of view: First, the recognition of the weaknesses of the present state of affairs in connection with the distribution of cars; the rapid growth in the number and the great variation in the character of these establishments, and the impossibility of securing any fair agreement in efficiency under such conditions of growth. Second, the fundamental values to be secured out of the particular elements in the distribution system and how these values are to be obtained in working from the present condition.

Hasty or Radical Changes to Be Avoided

The individual manufacturer cannot afford to ignore the great variation in efficiency, the lack of co-ordinated policy, the difficulties with service and the other conditions facing him in his attempt to market his product under present conditions. At the same time it is necessary for him to be wary in considering any radical changes in the system of distribution because the present inefficiencies and difficulties are not necessarily inherent in the system. They may be only due to the rapidity of its growth and the lack of long experience in the individual concerns comprising it.

Considering the question of what use is the distributor to the car manufacturer—the advantages of the distributor are these:

1—The distributor permits a better and more orderly credit condition and a larger and more regular control of production fluctuations so that a better manufacturing condition may be maintained. Due to his ability to obligate himself for a larger number of cars and due to the fact that his credit conditions may be more easily determined, the extent and character of the obligation permits a more definite consideration of the manufacturer's position in the necessary speculation upon future operations.

2—The distributor is in a position to supervise intensively and to develop the sales and service conditions and methods of the individual retailers in the several localities in his territory.

Difficulties of Rapid Growth

It will be contended by the manufacturer of automobiles that the distributor does not actually perform these functions properly in most of the cases. The contention has some merit, but it arises principally out of the newness of the business and the conditions of its growth in the absorption of the product into a virgin market. If these functions can be performed more economically by a factory branch than an independent establishment, there is some ground for considering the factory branch as a proper element in the distribution scheme.

If the most efficient of the distributors are able, under the best practice of today, to perform these functions satisfactorily, their success is a demonstration of the feasibility of the system to fulfill the economic necessities and consideration should be given accordingly. The method of using independent distributors has the advantage of being more flexible. It does not commit the manufacturer to a certain policy involving actual location, area and development in each particular city in which the central distribution point is considered.

The disadvantages of the distributor are:

1—The intervention of the distributor under the present conditions makes it a little more difficult to control the conditions of sale and the market for the product.

2—The intense application of the market which is necessary under the present conditions of marketing may not be secured through the distributor's system except in certain individual cases.

These disadvantages, however, are not inherent in the system of going through the distributor, but are concerned largely with the present conditions in the field and the great variation in the character of distributors' organizations due to the rapid growth and economic conditions surrounding that growth. They are very practical difficulties and they must be overcome, but they do not make it necessary for the distributors to be eliminated from the system, except as the individual circumstances of the individual manufacturer operate to demand a change in his particular case.

Necessities of Manufacturer Govern Policy

In this consideration of the distributor no comparison has been made from a general economic standpoint between the distribution of cars through the wholesale organization and the distribution of cars directly from the factory to the retailer. The comparative advantage of either method depends somewhat upon the particular circumstances of the individual manufacturer. If the manufacturer is making a small number of cars and has a limited production in his factory, depending upon getting his market because of the intense individuality of his sales work and the character of his product, it is feasible to be in touch with a few well-selected dealers and to keep a close factory contact with those dealers.

Where the production is large and the cars must be distributed through a great many local points in order to secure the market, maintain their place and deliver adequate service, the organization required to deal direct with the retailers under these circumstances may become unwieldy and require the establishment of numerous branches that are in reality nothing but wholesale establishments controlled by the factory.

Where car production is large, practically all such production goes through establishments of a wholesale character. Whether they are controlled by the factory as branches of the factory or independent organizations concerned only with the sale of the cars does not alter the function.

It should be noted at once that the control of the market apparently resulting from direct contact between the manufacturer's organization and the retailer does not necessarily mean an increased efficiency in the market. Marketing is a business of ideas, initiative and judgment. Systems and methods, standardized values and appeals and similar mechanical circumstances of marketing are subordinate to the psychological values of initiative, judgment and adaptability in those conducting the marketing work.

The great competition in marketing is a competition of ideas, and one of the greatest difficulties in this marketing competition is the tendency to a similarity of market ideas and methods which robs the product of its individuality and decreases the efficiency of the whole marketing effort.

This part of the efficiency of marketing has been neglected to a very large degree, not only in this business, but in many other lines. It has not received the proper attention and it has a tremendous bearing upon the methods of distribution, which will maintain and improve the market under the more difficult economic conditions confronting us. The control of the manufacturer, exercised through factory branches to the dealer, may result in centralizing the decision and judgment, so that the efficiency of the individual work is lessened and the face of improvement considerably decreased.

Some Problems Before the Manufacturer

The present difficulties with which the manufacturer is faced are naturally the result of the rapid growth, a great influx of dealers into the business, a wide variation in the standards of business operation and in the understanding of the necessities involved in the marketing.

These things cannot be wisely changed by means of any patent medicine methods which cannot be applied equally to all cases. Such methods are likely to add confusion to the present difficulties instead of clarifying the situation. Some of the main elements involved in these difficulties are contracts, quota deliveries, requirements of service, credits and the handling of used cars.

A general consideration of the activities of the car dealer and his economic place will form the subject of the next and last article.

How Did It Happen?

WHEN we are working close to business we are sometimes inclined to take many of the conditons for granted, which is a poor state of mind as concerning the future. Just such a series as Mr. Tipper has written, analyzing the growth of the distribution system now employed, helps give a clear vision of how certain difficulties have come about and will be of value to the dealer and distributor interested in what may be expected in the future. Next week's article will be concerned with the functions of the dealer in car distribution.

Lamp Service Operations on 33 Makes of Cars

NEED Seen for Standardization in Method of Retaining Lamp Doors or Rims—Lamp Makers Change Design of Lamps Too Often, Claim Service Men

NOT so long ago a woman drove her car into a battery service station and made the remark that the left headlamp would not burn. Naturally the service man's first move was to turn on the light switch. He noticed that what the woman said was true and then proceeded to find the cause of the trouble. As might be suspected his first thought was of the bulb, inasmuch as all the other lights worked all right.

The car was fitted with head lamps of the drum type and they were apparently new to the service man. He looked the lamp over and grasped what to him appeared to be a removable cover containing the glass. He grasped it with both hands and tried to turn it to the right or left, but it would not give a fraction of an inch. Then he resorted to more drastic measures.

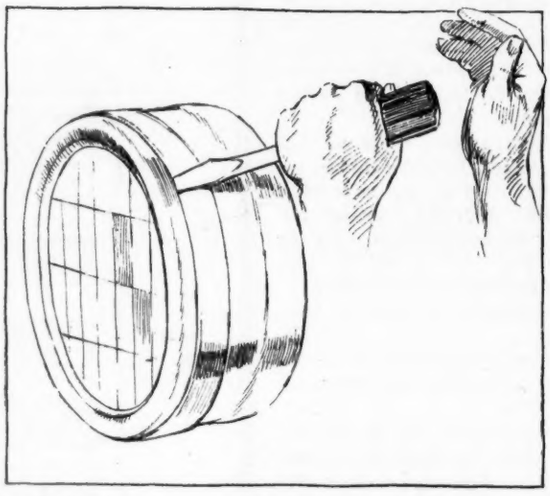
He took a screwdriver and jammed it between the joint and gave the end of the screwdriver a few blows with his hand. Still nothing budged. The only thing that happened was that the screwdriver slipped frequently and scratched the black enamel on the lamp. The center portion of the lamp was not injured because it was nickel-plated.

Easy if You Know How

After various vain attempts to remove the glass in the lamp the mechanic discovered a small screw in the bottom of the lamp. About this time another customer who happened to be in the service station at the time and who was familiar with the lamp gave the mechanic a tip as to how to remove the glass. He told him to remove the small screw which he just had discovered, whereupon the retaining ring sprung out at the bottom. Then it was an easy matter to slip the ring out of the lamp shell. The mechanic had found out how to do the job, but a perfectly good enameled surface had been marred in finding out.

The chances are the next time this mechanic comes into contact with a lamp with which he is not familiar he will look it over carefully to note its construction and not resort to forceful methods. The mechanic's own words after he had removed the lamp cover were, "They are trying all sorts of new fangled ideas these days." And, in this connection it is interesting to read what one of the car makers has to say about the service work on lamps. He says:

"I believe that the principal reason that repair shop mechanics are not familiar with the construction of the different lamps is due to the fact that the lamp manufacturers seem to change their lamps every few weeks. I know this has been our experience and while one or two of the changes can usually be charged up to the automobile manufacturer's purchasing or sales departments, the lamp manufacturers themselves seem to feel that they change the method of fastening rims and doors just as often as they wish and without any regard to the interchangeability of the parts affected."



This article was prompted by the fact that a mechanic not accustomed to the drum type of head lamp tried to force off the cover with a screwdriver

It hardly is to be expected that all automobile lamps will some day have identically the same way of removing the rim or door to get at the bulb. There will always be those makers who will fancy some certain way of constructing their lamps, which from a manufacturing standpoint is all right. Certain products have certain characteristics by which they may readily be distinguished and this is true of automobile lamps as it is of typewriters.

Standardization of Lamp Rim Retainer

Standardization in regards to automobile lamps has been carried out to some extent by the Society of Automotive Engineers, particularly in regards to bulb sizes, head lamp socket focusing, reflectors, etc., and there are some recommended practices as regards lamp mounting, brackets, focusing length of lamps, etc. All this has helped in the reduction of complicated designs and construction of lamps, but as yet there seems to be nothing to indicate that lamp makers will agree to any great extent upon the method to be employed in retaining the lamp rim.

At the present time there are as many ways of retaining lamp rims as there are styles and shapes of lamps.

If there is a trend towards the use of any particular method of retaining the rim it probably is that construction wherein the rim is held in place by either a bayonet type joint or springs, so that to remove the rim it is only necessary to grasp it with both hands, give it a slight turn, usually towards the left, and then withdraw it from the shell. This is, perhaps, the simplest construction and is readily appreciated by the average garage mechanic. Out of some thirty-eight makes of cars investigated it was found that fifteen of them used the above type of construction.

In each of these cases it is possible to remove the rim after the manner mentioned, but in other cases where the same procedure is used the rim first must be unlocked. This generally is done by

a small lever at the bottom of the lamp. In still other cases it is accomplished by pressing a small button, or there may be two such buttons at diametrically opposite points on the rim.

Lastly, there are those lamps which use all sorts of rim fastening methods from the hinged door with a clasp to the ordinary screw retained rim. Many of these constructions are obvious to even the most untrained mechanic, but some of the others are more puzzling.

In order that the service man may become familiar with the various methods now used for lamp rim removal, we present on the next two pages illustrations and text matter covering the operation on thirty-three makes of motor cars. These instructions cover practically every type of lamp made in this country.

In connection with lamp lens removal it might be well to state that one of the common sources of rattles in cars is due to a loose lens. Every time a car goes over an obstruction the glass slides up and down in the rim and produces an annoying rattle. This generally can be overcome by bending down the prongs which hold the glass.

Occasionally it is well to replace the packing ring on the lamp shell. This not only serves to hold the glass more firmly but has the additional advantage of keeping out dirt and moisture.

In replacing those lens frames which are held on by a bayonet type of lock, care should be taken to see that the small hole drilled in the rim is at the bottom of the lamp when the rim is firmly locked into positions as the purpose of this hole is to drain any water which might get into the lamp.

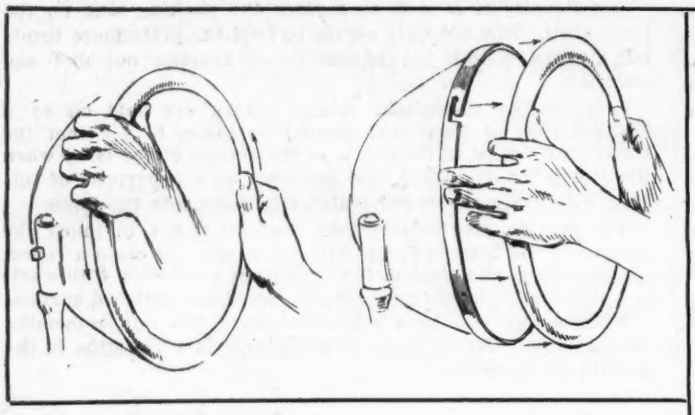
The service man should take precaution not to touch the surface of the lamp reflector with his hands. To clean a reflector use cotton and alcohol. Never dust off a reflector with waste or a dry rag. This will only scratch the highly polished surface.

When a bulb has been replaced with a new one, remember that the lamp should be focused, as there is a variation in the lengths of filaments.

Service Operations on Various Types of Lamps Used on an Enclosed Car

WHILE the removal of the lamp door or rim on a good many types of lamps is obvious, there are some which might give the untrained mechanic a little difficulty. For that reason we show above the methods used in getting at the lamp bulb on all of the lamps as used in the Reo sedan. There are modifications of these methods, but the above will suffice in giving a man some idea as to what to look for. No. 1 is a parking lamp. Remove screw at rear of lamp and pull off the cap. No. 2 shows the dome lamp which is of the bayonet type. To remove, press upward on glass frame and turn to left. No. 3, tail light. Pry off retaining wire. No. 5, parking light, remove one screw under lamp and raise side to get at bulb. No. 6, corner light, remove two screws from frame and take out glass. No. 7, parking light, remove screw and take off clamping ring. No. 8, tonneau light, remove two screws from lamp body and pull off front section

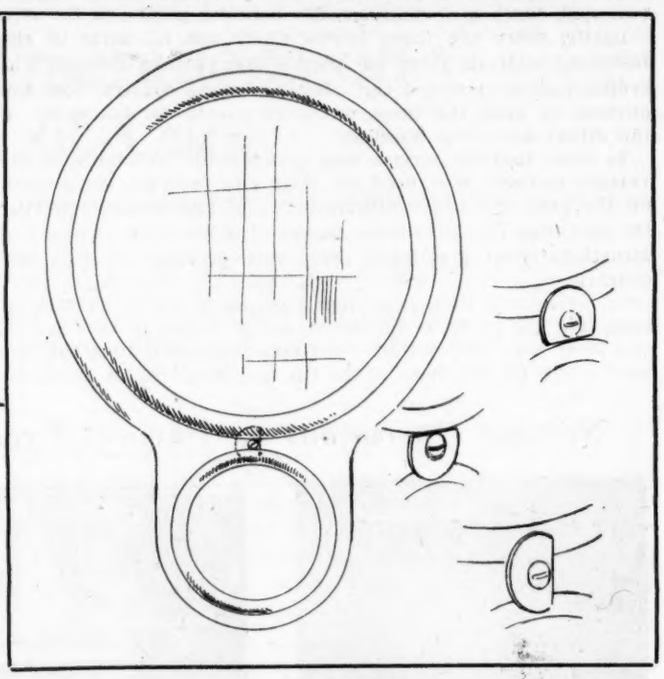
How the Lamp Doors on Some of the American Cars Are Removed



ABOVE is shown the most simple form of securing the lamp rim and the manner of removing the rim. To take off the rim, the service man presses it firmly against the lamp body and while doing so rotates the rim to the left. Usually it is necessary to rotate the rim about 30 deg. whereupon it can be pulled away from the lamp shell. In most cases it will be found that the lamp rim is retained in the shell by three concealed springs installed inside the lens frame, or rim. Some rims have slotted flanges welded to the inside and in replacing the rim attention must be paid to get these flanges exactly opposite the holes provided in the lamp body.

The following cars use a head lamp wherein the rim is removed by the methods described above:

Buick (some models)	**Hupmobile**
Chalmers	**Maxwell**
Chandler	**Oakland**
Chevrolet	**Oldsmobile**
Columbia	**Overland Four (present model)**
Dodge Brothers	**Scripps-Booth**
Dort	**(several models)**
Elgin	**Studebaker**
Hudson	**Willys Knight (present model)**



SEVERAL of the higher priced cars now are fitting a type of headlamp wherein an auxiliary lamp is fitted at the bottom. In most cases a single retaining device is used for the lens frames in both lamps. Some of these lamps have a sort of semi-circular button held in place by a screw placed between the two lens frames. To remove the upper frame the screw is turned one-quarter turn and an additional half turn allows the lower or smaller lens frame to be removed. Some of the double type headlamps use a modification of this method, but in every case the retaining device is located between the two lamps.

On the Crow-Elkhart the upper door is removed by a button on the top side of the lamp and towards the front edge of the lamp body. Then the door can be turned to the left and removed. Two small screws hold the lower or small door.

The following five American cars are using the double type of headlamps: **Auburn, Cole, Crow-Elkhart, Premier, Wescott.**

Miscellaneous Headlamps and Method of Lens Frame Removal

ANDERSON

THIS car uses the drum type lamps. To remove rim, loosen the set screw underneath and near the front of the lamp until the nickeled rim which holds the lens in place is seen to spring forward slightly. Then the rim can be pulled downward and away from the lamp, allowing the lens to be removed.

EARL

TO remove the rim proceed as follows: At the top of the lamp is a pin which must be hooked into the spring retainer stamping at the top of the lamp. With this pin hooked in rotate the rim counter-clockwise until the lower part can be pushed inward. Then rotate the rim clockwise, or right, until it stops. The rim can then be removed. When the rim is off the bulb can be taken out and when the bulb is out, the reflector can be removed. A screw is provided at the back of the lamp accessible from the outside for adjusting the focus.

GRANT

ON Grant cars fitted with the Indiana lamp 1021 (serial numbers 50001 to 52700) press the button under the body of the lamp to release the catch holding the door and rim assembly. Pull the bottom of the door and rim assembly forward and lift it from the lamp.

On cars (serial numbers 52701 to 55000) turn the rim anti-clockwise until the door catch spring seats against the body. Then pull the rim forward and off.

Cars (serial numbers 55000 to 61125) loosen the locking screw on the inner edge of the top of the lamp body, taking care not to loosen the screw more than two or three full turns. Pull the rim forward on inner edge until it is free from the catch.

On cars (serial numbers 61126 to 62000) the lamps are equipped with clamping rings on the outside of the lamp doors and rim assembly. Remove the locking screw and lift off the clamping ring.

The present model of the Grant is fitted with lamps of the drum type, and have the same method of holding the rim as mentioned in the preceding paragraph.

JORDAN

JORDAN has used three types of headlamps. The first was used on cars with serial numbers 10001 to 10500, the second 10501 to 14420, and the third 14420 to 15500.

On the first type there is a clamp screw on the side of the lamp. It is only necessary to loosen this, when the band surrounding the lamp can be taken off. The lens will come off with the band.

On the second type there is a set screw at the bottom of the front of the lamp. To remove lens, turn this screw with a screw driver as far as possible, which will revolve

the locking cam. When the cam has been turned as far as it will go, the retaining ring will spring out at the lower edge. This ring also is held at the top by two lugs. By pulling the ring down these lugs will be disengaged and the lens can be removed. If the ring sticks loosen it with a knife inserted between it and the lens.

In the third type the retaining ring is held by a set screw at the bottom of the lamp. By loosening this the retaining ring will spring out and can be pulled from the lamp. There are two lugs on this ring also.

MOON

THE bulbs in these lamps are replaced by removing the band which surrounds the doors of the lamps and slipping the doors off. The screw anchoring this band is located at the under side of the lamp.

REO

ON the Reo the head lamp rims are kept in place by a nickeled band which surrounds the lamps. The screw which clamps these bands is located at the bottom of the lamp. Removal of the bands allows the doors to come off.

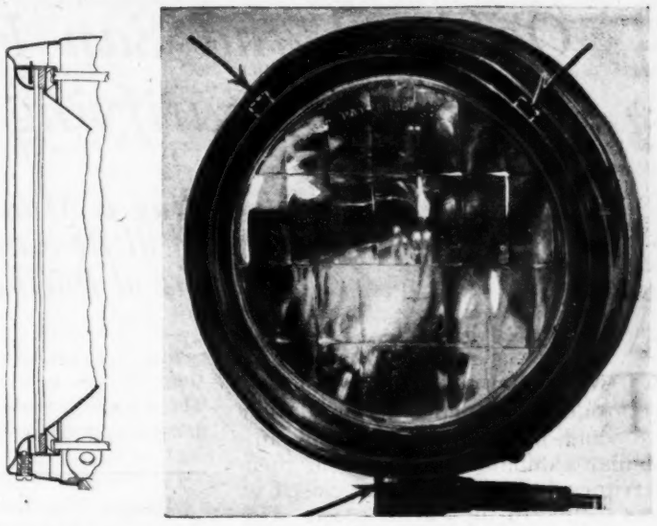
STEPHENS

STEPHENS uses practically the same method as that mentioned in the two preceding cases. Here also, the locking screw is located at the bottom of the lamp. The side lamps on all models are removed by taking off a nut on the inside of the body under the cowl, directly back of the instrument board. The rings holding the lens in these bullet lamps are taken off by simply unscrewing.

STUTZ

TO remove headlamp rim first loosen the locking screw on the lower side of the lamp. Then turn the rim or door to the left as far as it will go, then lift straight off.

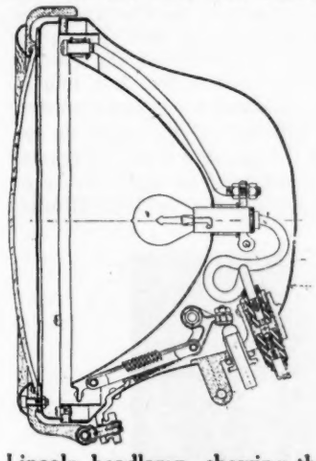
In case of the spot light, remove the screw in the clamp on the outside of the lamp which will allow the door to come off with the lens and reflector. Remove the locking ring back of the reflector, which allows door and lens to come off reflector.



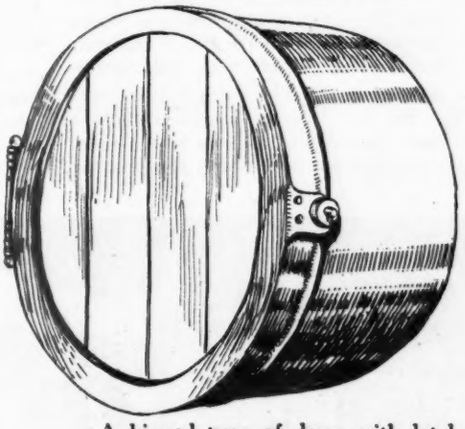
The drum type of headlamp as used on Jordan is shown here. To remove the lens, the small screw at the bottom must be removed, whereupon the retaining ring will spring forward. Two small lugs hold it in place at the top

VELIE

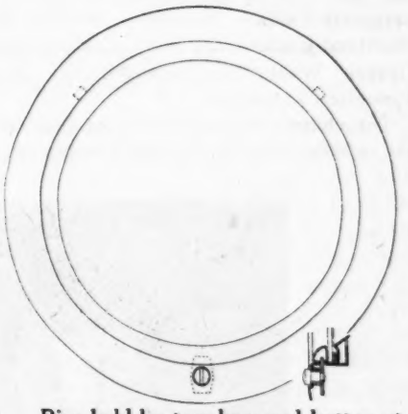
PRESENT models of the Velie are fitted with lamps wherein the doors are hinged and secured by a snap on the side of the lamp. This snap is released by a push button from the outside. The new model of the Velie is fitted with lamps also having a hinged door, but secured by the old-fashioned latch and thumb nut. As the door swings forward it carries with it the lens and leaves the reflector mounted in the lamp shell.



Lincoln headlamp, showing thumbscrew and latch at bottom

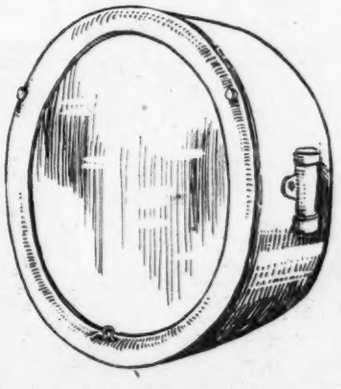


A hinged type of door, with latch and thumbscrew

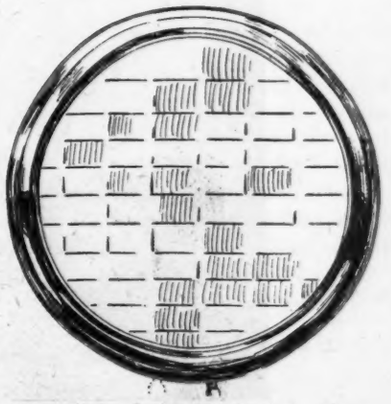


Rim held by two lugs and button at bottom

Here the rim is held by a clamping ring and screw



Two screws at the top and a catch at bottom hold this rim



Many bayonet type locked rims have a safety catch

Oakland and San Francisco Show Sales Gratifying to Dealers

Attitude of Selling a Man Only Something That He Needs and Will Be Satisfied With Strengthens Buying at Pacific Coast Displays

San Francisco, Feb. 28.

TWO automobile shows, either one of them considerably larger and better attended than any similar exhibition ever held in their territory before, have just closed in this section of the Pacific coast. The first to open was the Oakland show, which ran a week, starting Jan. 16, and the other was the Pacific Coast Automobile Show, which started Feb. 11 and ran for one week in the Exposition Auditorium, San Francisco. Both shows presented more exhibits and more individual exhibitors than had ever appeared at a previous show in either Oakland or San Francisco.

Results of both shows were most gratifying to the dealers, and, as evidenced by the attendance, were fully appreciated by the people of all of Central and Northern California. The attendance at the Oakland show was approximately 20,000, and that at San Francisco ran considerably above 100,000. Robert W. Martland handled the Oakland show, and George Wahlgreen managed the San Francisco exhibition.

The change in the attitude of the buying public toward the automobile was reflected in the exhibits and in the attitude of the exhibitors at both shows. They were literally "show me" shows, demonstrations were constantly being made, automobiles were taken down and reassembled, lectures and motion pictures were given, all tending to feed the desire of the purchasing people to know all about the cars, to help them to make a better selection, and to prove, on comparative merits which was the better car.

Dealer Has Record of Exhibiting at 25 Shows

DON LEE, California distributor for the Cadillac, won his spurs as oldest exhibitor in the state, when he proved, during the show, that he had had exhibits in 25 California automobile shows. He has been handling Cadillacs since 1903, and was one of the largest exhibitors at the first show held in the state, in Los Angeles, 1907.

The old attitude of many dealers that their only object was to sell a man a car, whether or not it was the one he wanted or needed, was gone, and in its place came the idea of helping the prospect to buy a car intelligently, one within his means and within his needs. The Pacific Coast automobile dealer has come to realize that the life of his business depends on the public's attitude toward the car he sells and toward himself, and that the people are the meal ticket of the automobile industry.

And this attitude proved an immediate business getter, as well as a builder of prospects. From the floor of the Oakland show 129 cars were sold, by actual count, and this number was fairly divided between high, medium and low priced cars. At the San Francisco show, sales two days before the end of the show had reached almost exactly twice the number at the Oakland show.

This is about the proportion to be expected due to relative population of the two cities, and due to the further fact that many prospects at the Oakland show became buyers at the San Francisco show. Despite two days of the coldest weather San Francisco Bay has had in 30 years, the Oakland show was crowded. There were 150 cars of 42 makes on exhibit, and on the opening night an official counter returned 1,500 as the number of cars parked around the Oakland Munici-

The Oakland automobile show stands as one of the best looking of the season

pal Auditorium. Mrs. P. K. Webster, Jordan dealer, was the only woman exhibitor.

Two Shows Have Strong Cumulative Effect

The Oakland show was a fitting vestibule to the San Francisco exhibition, putting prospects into the frame of mind to buy immediately, and convincing dealers that two shows close together are good for the trade, and that, if the same dealer gets into both shows, he reaps more than double benefit, since the impetus of the first show is applied to the second by the public mind. In the San Francisco show there were 52 exhibitors, representing 56 makes of cars, and filling all the main floor of the great Municipal Exposition Auditorium, and the basement as well. The new Doble steamer, now being built in San Francisco, and the Stanley steamer attracted a great deal of attention. The balance of the display included 19 four-cylinder, 21 six-cylinder, 14 eight-cylinder, and several twelve-cylinder designs.

It was found necessary—as usual at shows—to put the commercial vehicles in the basement, but to make up for this, Manager Wahlgreen, in his decorative scheme, made an especially attractive Chinese opium den layout, with Chinese musicians, Chinese dancing girls, and all the other allurements of the Oriental resort, for the basement, and thereby gave the trucks a better show than they ever have had at a show out here before. Some passenger cars were in the basement, too, but, in addition to them, there were 25 firms exhibiting commercial vehicles, the best and largest commercial vehicle exhibit ever made here.

On the second floor the equipment men held forth, with 120 exhibitors, the largest number of accessory dealers ever gathered together in one show west of Chicago, and this large exhibit in the face of the fact that the Pacific Coast Automotive Equipment Exposition closed only Jan. 26, in the same auditorium. Approximately 1,000 different accessories and parts, manufactured both in the United States and in foreign countries, was included in the exhibits, which were shown beneath the similarly vivid Oriental decorations and surroundings which marked the whole show as the most brilliant ever held here since the dealers began these annual exhibitions in 1917. Virtually every dealer in automobiles and accessories in Northern California was represented at the show.

Among the cars shown to Pacific coast spectators for the first time were the Rickenbacker, Durant, Duesenberg, Doble Steamer, Earl, Wills-Sainte Claire and Leach.

Many Factory Executives Attend Show

The show was marked by the attendance of some of the well known executives in the automobile industry, and a number of these remained several days to look over the situation in the industry on the Pacific Coast. California has been a bright spot on the map of the automotive industry for the past 18 months or two years, and these experts seem to realize that this part of the country is still free from the depression which has overtaken most of the rest of the nation, and that they must pay much attention to western distribution right now. Among those who came West for the big sixth annual Pacific Show, were:

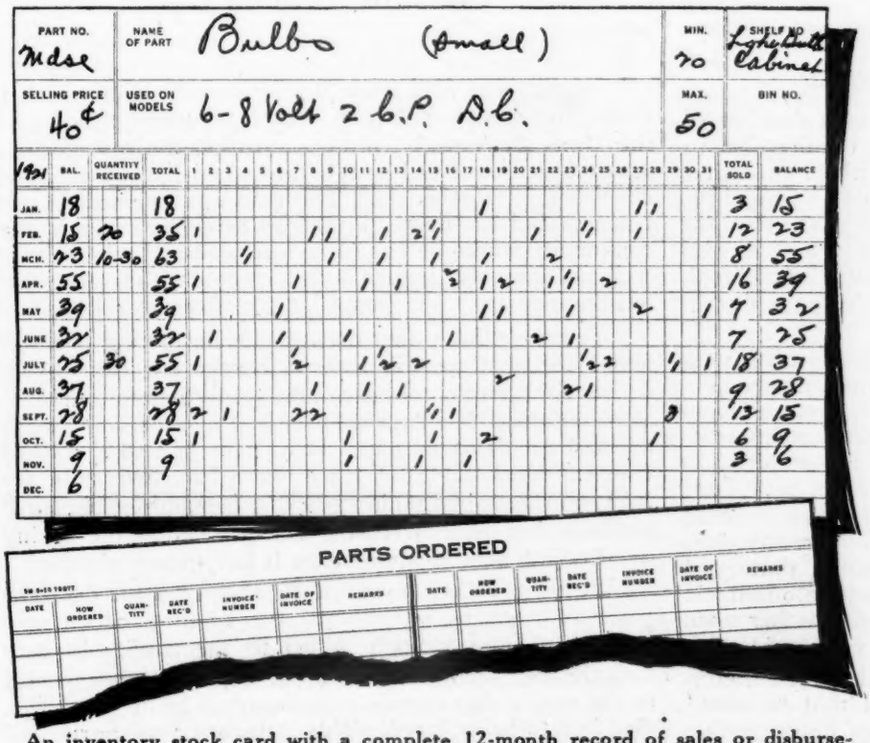
J. J. McDuffie, sales manager of the Cole Motor Car Co.; E. V. Rickenbacker, head of the sales division of the Rickenbacker Motor Car Co., and W. J. Drumpelmann, sales manager, who was in charge of the Rickenbacker exhibit at the show; H. H. Rice, president of the Cadillac Motor Car Co.; J. McM. Wetmore, factory representative of the Chandler and Cleveland companies, who came West to take charge of the exhibits of these cars in the show and who has also established factory branches for them here; R. H. Collins, president of the Peerless Motor Car Co.; Charles Schmunk, formerly president of the Peerless Co.; Jack French, sales director for the Dodge Brothers Motor Car Co., who, it is announced, will appoint a new Dodge Brothers dealer before he returns; Russell Gardner, president of the Gardner Motor Car Company.

The show was held under the auspices of the San Francisco Motor Car Dealers' association. Every newspaper in San Francisco and Oakland put out special editions for the Pacific show.

More attention and time was given the truck display by the general public than ever before.

During the show week, R. M. Northcutt, used car manager for Lee, put on a used-car show of his own in the main building of the Lee plant where he made a special display of rebuilt Cadillacs.

Inventory Stock Card With Commendable Features



An inventory stock card with a complete 12-month record of sales or disbursements of parts. The reverse side is a concise record of goods ordered and received

THE card reproduced on this page has several things to recommend it. It plainly shows on one side just what quantity of each article has been received during the month of the year and on the reverse side is a complete and concise record of all goods ordered and dates when received. There are 31 divisions representing the days of the months and each day's sales of any particular item is recorded in the space provided.

The balance on hand is recorded in two places and it is possible for the parts department to tell at a glance where it stands at any time. The cards to handle parts should be filed numerically in order to facilitate the locating of any card at any time, as very few persons call the same parts by the same names.

Merchandise and accessories, however, present a different aspect, and the cards for these can be filed by name to better advantage, such as lamp bulbs, tank caps, etc. This card has been brought out by W. W. Lindsey, Billings, Mont., and is said to be working out well in the establishments of both large and small dealers.

MOTOR AGE

Reg. U. S. Pat. Off.
PUBLISHED EVERY THURSDAY

Copyright 1921 by The Class Journal Co.

Vol. XLI Thursday, March 2, 1922 No. 9

THE CLASS JOURNAL COMPANY

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SUBSCRIPTION RATES
United States, Mexico and U. S. Possessions.....$3.00 per year
Canada.....5.00 per year
All Other Countries in Postal Union.....6.00 per year
Single Copies.....35 cents
Subscriptions accepted only from the Automotive Trade

Owned by United Publishers Corporation, Address 239 West 39th St., New York; H. M. Swetland, President; Charles G. Phillips, Vice-President; A. C. Pearson, Treasurer; Fritz J. Frank, Secretary.
Entered as second-class matter Sept. 19, 1899, at the post-office at Chicago, Ill., under the Act of March 3, 1879.
Member of Associated Business Papers, Inc.
Member of the Audit Bureau of Circulations.

What the Public Thinks

RECENTLY a canvass was made of a number of representative people on their opinion as to the Ford control of the Lincoln plant and what influence this would have on the sale of that automobile. The question was put rather pointedly as to the thought of this person between the Lincoln car and a well known competitor. The result was about a 50-50 break but some rather startling things were brought out in the details of these opinions.

The first inquiry was directed to prominent business and professional men and socially prominent women. The leaning toward Ford control was much more favorable among the women than the men. It was interesting to note that one man, who sells much material to the automotive industry, said that he feared that Ford "might cheapen the Lincoln by putting conventional Ford materials in this car." This man apparently does not believe, as does the automotive industry, that Ford is a buyer of good materials and that where quality is needed for a Ford, he puts in the quality. Another man, equally prominent as a professional man said that Ford's interest in this plant would give him added confidence in the car. A banker admitted that he could not discuss the question fairly because of his prejudice against Ford. The women put their O. K. on Ford and both of his cars.

Several well financed Jews were questioned. All of these agreed that the Ford interest in the Lincoln car had made it practically impossible as a social car for a Jew. They did not, however, hold this same objection to the Ford car. Apparently, the Ford car has no social distinction with them. One of the Jews is going to buy a Ford for his farm.

Several automobile dealers were questioned as to the effect the Ford interest might have on their business. These were of both competing and non-competing lines. All of these dealers expected the Ford interest in the Lincoln car to increase the sales of the Lincoln because of the added number of salesmen and because of the firm high opinion of Ford held in the rural districts. They did not think the ratio of increase in sales would hold true in the metropolitan districts.

It was not until the Ford dealers were reached that service was brought into this collection of opinions. The Ford dealers were, without exception, glad of the opportunity to sell the Lincoln cars and each believed that he could sell some Lincolns. These dealers said that many of the persons who had talked with them about the purchase of Lincoln cars had expressed the opinion that they could buy this car now with safety because very soon Ford would establish a universal service on this higher priced car. This was made the big point by the Ford dealers.

It appears strange that despite the floods of publicty printed about automobiles and the automotive industry that there is so broad a misconception as to certain points, especially that of service. It is just possible that no car manufacturer has the service system that he likes to tell the public about, but if he has, it would appear to be a very good point to stress in his publicity both paid and free. If the public is going to buy Lincolns because they believe that they will get service of the Ford standard on the higher priced car it is a good hint for some other high class car makers.

Need of a Clean Up

THE most amazing complaint from a dealer who does business with maintenance shops and departments was filed with MOTOR AGE this week. This came from a man who is in what is commonly known as the "Junk Business." In other words he buys used cars, tears them down and resells the parts that are in good condition, for further use. This man was a pioneer in this business and has built up quite an extensive trade in the community where he has always resided and where he is well and favorably known both to people within and without the industry. His complaint was about as follows:

"We are getting rather disgusted in our garage business and I feel that we will have to change our entire plan, or we will begin to consider ourselves as aids to criminals. Within the last few days we have had an especially heavy demand for damaged parts. One man wanted a cracked cylinder block and today we have had two calls for broken or damaged pinion gears. A demand for damaged products has been increasing recently and as the Spring overhauling season approaches it has grown sharper.

"We were rather mystified to as why these damaged parts were sought, but recently two or three of the men have been frank enough to tell us the truth. In each case the men have overhauled the car and have reported to the owner that certain parts were so badly worn that they had to be replaced. This statement was untrue and the maintenance men, feeling that he needed some proof to present to the car owner, has come to us to buy dam-

aged parts that he could show. We regard this practice as criminal and do not want to be implicated in it and yet some of our very good customers are making demands on us for these goods. We have refused any number of such requests."

This frank statement by this used parts dealer certainly sets forth the need of some radical house-cleaning in the maintenance business. It would seem that the time has come for the formation of a service association or a service department of the dealer association, which can conduct a house-cleaning campaign. The situation is very much like that which existed in some cities a few years ago and which still exists in some places. It was the use of the "authorized" service station sign indiscriminately by all sorts of alley shops in which the automobile owner was led to believe that he was getting approved and highly expert service, whereas he was really being swindled.

In several cities the dealer associations took this matter up and by threats of prosecution where the shop owner did not agree to take down the sign, soon cleaned up the situation. The dealer who made the above complaint would be quite willing to co-operate with any campaign to eliminate such practices as he has complained of. It is not at all unlikely that he would be willing to furnish to the proper persons the names of his undesirable customers. It certainly appears that there is a great field of work open in this regard.

Waste

A MEMBER of the MOTOR AGE staff, visiting the Chicago show, saw an exhibit which interested him personally, and he left his home address so that he might hear more about it. In the course of time he received a communication from the firm that had taken his name, calling his attention in very general terms to the prominent features of the exhibit. This communication did not tell him anything except what the most casual observer would have noticed. Such a communication is waste. It had no message.

But, worse than that: In an endeavor to make this communication look like something besides a mere bit of printed matter, a carbon copy of a letter was sent to the prospect. This carbon was mussy, it was dim, and it had every disadvantage possible to such a communication, except the pen signature of the salesmanager. This signature was so well written that instantly a doubt was aroused as to whether a busy man had personally signed the communication.

Altogether, this bit of sales propaganda was entirely worthless. It was worse than that, for this prospect thinks he is being made sport of. His intelligence is insulted. If the prospect's name was worth gathering, it was worth decent treatment. The way this effort was handled makes it pure waste, if not something worse.

This company should give the same careful thought to sales that it does to manufacture, or turn the sales over to someone who knows how to handle the retail prospect.

A 1922 Salesman!

WE HEAR much today of the necessity of better automobile salesmen. Recently a member of the MOTOR AGE staff had occasion to call on a friend on Sunday morning and found this man in his garage looking at a new six cylinder car which had been delivered to that garage late the evening before. It happened that this man had never driven a car of this sort and was little versed in driving any sort of a car. As a result he had a car but did not know how to start it. At the suggestion of the MOTOR AGE man a search was made for the instruction book, but none was found. The man who had delivered the car had made no effort to instruct any member of the family how to operate it.

The MOTOR AGE man took the car out of the garage and drove his friend to the salesroom from which the car had been delivered. They hunted up the man who had made the sale and asked him about the instruction book. He replied, "You will have to see the parts department about the instruction book."

When he was asked if there was oil enough in the car to make it safe to drive that day, the salesman confessed he did not know, and quickly demonstrated that he did not know, where to find if there was enough oil in the car.

It was a rather cold day and the salesman was asked if there was alcohol in the radiator. He did not know, nor was he able to answer the next question as to the capacity of the radiator.

After this demonstration of ignorance on the part of the salesman, the new car owner and his companion gave up and drove to an independent garage where they were courteously received and their wants attended to.

Let the Manufacturer Lend a Hand

THE perfection of precision tools and precision measuring instruments was of vast importance to all industry. Absolute interchangeability would not have been realized without the micrometer, production of automobiles by the thousands was made possible. By methods of inspection and checking of the dimensions of each part with measuring instruments of accuracy, a system for supplying spare parts to the owners was devised. The micrometer and the various types of precision gages are considered indispensable to the factory producing automobiles. Service facilities have not quite kept a pace with production but some methods of the factory that are applicable to the service station have been inaugurated.

Perhaps no other single item is as efficacious in eliminating worry in the overhaul of an engine or a thorough checking of the parts before assembly. A piston that produced a distinct slap after the engine was put in operation would have been detected before the reassembly if piston and cylinder had been previously measured accurately.

This brings the thought that perhaps a higher type of job could be inspected if manufacturers would supply accurate and extensive information regarding tolerances. Those tolerance sheets are valuable in that they act as a guide to the man who does the actual work on the car. On a sheet of this kind are shown the maximum, the minimum and the desirable clearances for all moving parts. The tolerance to be allowed on all fitting operations such as bearings, pistons, rings and the meshing of gear teeth are included in the data. The knowledge of this information would enable any maintenance station to accurately forecast the performance of an overhaul job long before the job is completed.

The tolerance table and the micrometer are indispensable to the men who maintain those same cars!

Dealer Confidence Is Returning

Detroit Factories Speed Up to Meet Growing Car Demand

Part Time Production Schedules Are Being Increased—Truck Sales Materially Increase

NEW YORK, Feb. 28—The coming of March reports indicate that factories in the Detroit district are preparing to speed up production. Sales have increased to a point where it is difficult to fill orders on the present part time basis and several plants will add a day or a day and a half to their working week.

Better business is felt particularly by the companies making cars in the $800-$1,000 price class but Cadillac and Lincoln both declare they have orders booked far ahead. The Lincoln Motor Co. has just awarded a $1,000,000 contract for 4 and 7 passenger body models. The Gray Motor Corp. and the Rickenbacker Motor Co. have placed large orders for supplies and are preparing to go into production. Other companies are releasing materials earlier than had been expected.

At least two prominent passenger car manufacturers are preparing to bring out new models. It is freely predicted that before the year is over greater stress will be placed on gasoline economy and less on the initial price. High mileage per gallon of gasoline will be one of the talking points for the $348 assembled car which W. C. Durant has contracted to build.

Evidence of the increased demand for light delivery trucks is found in the fact that 1,000 more Ree speed wagons were sold in January than were produced at the factory. Substantial gains also were made in January by makers of heavy duty trucks.

The optimism of manufacturers probably is a reflection of the increased confidence of dealers in all parts of the country. Reports from shows everywhere tell of more sales at retail than last year and greater interest by the public. Everything points to a substantial spring business, both in passenger cars and trucks. Unusually mild weather already has roused the motoring urge.

Business of parts and accessory manufacturers in January was materially larger than in December and the indications are that February reports will be still better. They are now feeling the full benefit of deflated inventories. Even machine tool makers are having inquiries from vehicle manufacturers who see the need of putting their factories in better position to meet keen competition.

Production of pneumatic casings for 1921 reached the unexpectedly large total of 21,820,041, but there are no accurate figures for 1920 with which to make comparisons. However it was little if any larger in that year.

Both domestic and foreign sales for the first two months of the year have been so far ahead of the same period in 1921 that there is danger of rousing exaggerated expectations for the remainder of the year, but the difference in volume will grow smaller as the year progresses.

H. H. Franklin Denies That He Will Buy Willys Corp. Plant

Syracuse, Feb. 27—Reports that the H. H. Franklin Mfg. Co. is considering the purchase of the Elizabeth, N. J., plant of the Willys Corp. from the receivers are authoritatively denied. An inspection of the property was made by H. H. Franklin at the request of the receivers. As a result of this inspection it has been said that the Franklin company might buy the Elizabeth factory to manufacture its four-cylinder air-cooled car. The company already has begun preparations for the erection of a plant for this purpose near East Syracuse.

Syracuse, Feb. 24—Directors of the H. H. Franklin Co. have decided to issue 40,000 shares of no par value common stock at $50 a share and $3,000,000 of 7 per cent cumulative preferred stock with a par value of $100 to finance the production of the new Franklin four cylinder air cooled car. The plant which is to be erected will have a one shift capacity of 50 cars a day and a two shift capacity of 100 a day. A world wide sales organization is being developed on a 100 a day production basis.

Voorhis Made Vice President of Nash Motors Company

Kenosha, Wis., Feb. 27—Charles B. Voorhis has been promoted to vice-president and director of sales of the Nash Motors Co., and Earl H. McCarty, formerly of the Studebaker Corp., has been made sales manager.

"In the past five and one-half years," said C. W. Nash, "Nash Motors has risen from 24th to 9th place in the automobile industry in volume of business and is today one of the six organizations manufacturing 84 per cent of all motor cars made."

UNITED AUTO STORES RECEIVER

Philadelphia, Feb. 24—Temporary receivers were apopinted for the United Auto Stores, Inc., by Judge Thompson in United States district court today. They were Francis F. Burch and Major Samuel A. Whitaker, who immediately took charge of the corporation's principal store here. The company sold motor car accessories and is said to have operated 57 other stores in Pennsylvania, New Jersey, Delaware and Maryland.

Liabilities of the corporation were placed at $1,250,000 according to a petition filed in federal court.

Dealers Apply Ethic Code To All Future Business

Declare Against Price Concessions and Unbilled Accessories in Car Sales

MARINETTE, Wis., Feb. 24—At the annual meeting of the Twin City Automotive Dealers' Assn., comprised of dealers and repairmen in Marinette, Wis., and Menominee, Mich., located on opposite banks of the Menominee river, George Quimby, the oldest dealer in this section of the country, was re-elected president. J. R. Hubley was elected vice president; H. S. George, secretary, and Harry A. White, treasurer. The association adopted a "Code of Ethics" to which all members, numbering 18, subscribed. This code is as follows:

"All new motor cars will be sold at full list price, plus government war tax, freight and unloading charge.

"No spare tires or accessories of any kind other than standard equipment will be included unless they are billed to the purchaser at full list price.

"All used car appraisals will be based upon the current used car market report of the Chicago Automobile Trade Assn., using the figures quoted in Zone 9 as a maximum."

Toledo Business Men Now Control Willys-Overland

Toledo, O., Feb. 24—At a special meeting of the directors of the Willys-Overland Co., held here this evening, Charles B. Wilson was elected general manager and vice president to succeed Walter Chrysler, who resigned last week to take charge of the Maxwell Motor Co.

James E. Kepperly, New York city, and George Spencer, resigned as directors at today's meeting and W. W. Knight and C. E. Bunting, two prominent Toledo business men, were elected to succeed them.

L. A. Miller, Toledo, was also elected secretary to fill the vacancy caused by George Spencer's resignation. Nine of the eleven members of the board of directors are Toledo men or represent Toledo business interests.

QUAKERS OPPOSE EXTRA TAX

Philadelphia, Feb. 24—In protest against the policy of state and national legislators seizing upon the automotive industries to shoulder additional tax burdens whenever extra money is wanted for public purposes the Motor Truck Assn. of Philadelphia has gone on record as being steadfastly opposed to such methods.

Increasing Sales Is General Report

Chicago Sales Reflecting Good Effect of Recent Show

January Deliveries Far Ahead of Year Ago—February Will Have Better Score

CHICAGO, Feb. 27—Sales of automobiles in Chicago and territory are showing the beneficial effect of the Chicago show. The best selling show in the history of the industry in Chicago is carrying sales force that is being realized upon every day. In Chicago there are very few reports of slow sales. Business in almost every instance is better than it was in January and the first month of this year was much better than January of 1921. February is going far ahead of January.

Sales are not confined to any price class although there is a greater demand under the $1,600 class. High priced cars are moving and sales compared with those of a year ago and a month ago are very satisfactory.

Evidence given in three specific instances show that sales increase from 30 to 40 per cent can be attributed to the Chicago show. These figures are reached by crediting the show with the sales that have resulted from following up prospects secured at the show, and not on the dealer's lists at the time of the show.

Country business is slow. Small-town dealers are not stocking up on cars as readily as in other years and their reports are to the effect that spring will be well advanced before there is a pick-up in sales in rural districts. Farmers are making inquiries and it seems to be the general belief that when the season clears up and the roads open that the farmer will come forward with the assertion that he is not as bad off financially as he has been pleased to allow the public to believe.

There is evidence of returning life to the Chicago motor truck factories. Retail sales, however, in the city are slow. There is one glaring exception to this state of the market. H. Paulman & Co., Pierce-Arrow dealers, find a steady demand for Pierce-Arrow trucks. This demand has not developed within the last week or two but has extended over a period of several months with an increase rather than a decrease in sales.

There is an increasing market, as spring opens, for used cars and many sales in this line of the industry are reported.

Indianapolis, Feb. 24—Truck and commercial vehicle business is on the upgrade in this city and in the state. One large distributor reports that during January his establishment did as much business in delivered vehicles as during the first three months of 1921. The first 20 days of February brought in as much business as the whole of April, 1921, which was one of the comparatively good months of last year.

Another truck man with a purely local business claims that the first five weeks of this year brought him as many orders and deliveries as did the last six months of 1921. Prospects for a brisk February and March are good.

Another distributor with a light speed type of truck says that through the latter part of the 1921 season, there was improvement, and that there seems to be a strong demand for his commodities right now. There is some out of town business at this establishment though the territory does not embrace the whole state, the southern part of which reports better truck business in some lines.

On the other hand there are local selling agencies which report business as slow as at any time last year, but on the whole these do not seem to be the progressives, or those which have put much force into merchandising. Hustlers with the right articles seem to be finding business.

Detroit, Feb. 27—Business in used cars in February in the Detroit district is exceeding the business in new cars by 20 per cent, according to reports received by the Detroit Automobile Dealers Assn. Business in new cars is running far in advance of last year and at least one dealer reports that with favorable conditions continuing, he will have the best February business ever enjoyed.

RAIN STOPS BEVERLEY RACES

Los Angeles, Feb. 26—For the second time within a week the 250-mile championship automobile race at the Beverley Hills speedway near here was called off today because of rain. The race was originally scheduled for Washington's birthday but rain interfered. The race today was called off in the 94th lap after a light rain had rendered the track dangerous. Tommy Milton was in the lead. The race will be run March 5.

The decision to call off the race came in the 92nd lap when Pietro Bordino, the Italian driver, narrowly escaped death. His car skidded and crashed into the fence. Bordino was not injured.

YANKEE PUMPS MUST GO

Bridgeport, Conn., Feb. 24—Under a ruling of the state motor vehicle department, between 300 and 400 gasoline curb pumps now installed throughout this city will have to be taken out and discontinued. The state requirement is that all curb pumps shall be placed at least 16 feet back from the curb line.

Employment Increase Shows Automotive Industry Active

Bureau of Labor Statistics Also Emphasize Substantial Pay Roll Bulge

WASHINGTON, Feb. 27—Through comparison of employment in 47 identical establishments in the automotive industry reporting a payroll for a period of one week for December, 1921, and January, 1922, a decrease of 5.9 per cent was shown in the number on the payroll and a decrease of 35.8 per cent in the amount of payroll for these months. Study of employment in these places for January, 1921, and January of the present year, shows an increase of 135.5 per cent in the number on the payroll in January, 1922, and 45.4 per cent in the amount of the payroll. These figures were compiled by the Bureau of Labor Statistics from reports concerning the volume of employment from representative establishments in 13 manufacturing industries.

The comparison for January of last year and January, 1922, for the 47 establishments covering a period of one week, shows that in January, 1921, 36,588 were on the payroll and for the same month this year, 86,166. The amount of the payrolls in these 47 establishments for one week in January, 1921, was $1,042,-144, as compared with $1,515,399 for January, 1922. These identical establishments in December, 1921, had 91,682 on the payrolls and 86,282 during January, 1922, a decrease of 5.9 per cent. The amount of the payroll was $2,363,481 in December, and $1,518,331 in January, 1922.

A survey by the Bureau of Labor Statistics stated that "a decrease of 15 per cent to all men was reported by one establishment. Two plants reported a wage rate decrease of 10 per cent, affecting the entire force in one, and 60 per cent of the force in the second. Sixty per cent of the men in one plant were cut 8 per cent in wages. Some establishments in this industry were partly closed owing to lack of orders. When per capita earnings for January and December were compared, a decrease of 31.7 per cent was shown."

IOWA TRADE BUREAU MEET

Davenport, Ia., Feb. 24—Fifty counties through this section of Iowa were represented at the meeting of the Iowa Motor Trades Bureau in Des Moines, March 1. A. F. Knapp is secretary, H. J. Lytle of Davenport is president, E. Makiben, Cedar Rapids, vice president, and Dean Schooler, Des Moines, treasurer.

San Carlos Offers $100,000 For Armistice Day's Races

500-Mile Event Will Be Handicap Affair Between 122 and 123 Cu. In. Engines

SAN FRANCISCO, Feb. 24—Announcement is made by the Greater San Francisco Speedway Assn., owners of the San Carlos Speedway, that $100,000 in prizes will be awarded in the automobile races on Armistice Day, Nov. 11, 1922. The highest prize is for a 500-mile race, and is $50,000, with an additional $25,000 in "citizens' lap" prize money, and $25,000 or more in tire, spark-plug, ignition and other accessory bonuses. The putting up of these prizes places the San Carlos Speedway and San Francisco in position to challenge Indianapolis and Los Angeles for big league honors in speedway racing.

The 500-mile race will be a handicap affair, in which the cars with 122-in. engines will compete against the 183-in. size on a graded basis. This should stimulate a large entry list of 122-in. cars for the 1923 Indianapolis race, which is limited to that size. Some 16 to 20 of the smaller cars will be built in the United States prior to that event, but the San Carlos affair should be a stimulant to have these smaller cars completed at an earlier date so as to get a thorough try-out in the California classic, and thus obtain standards for the Indianapolis contest.

San Francisco, Feb. 24—Jack Prince, who built the Cotati Bowl, and the San Carlos Speedway, near here, announces that negotiations have been commenced for the construction of a speedway (wooden track) for automobile racing, either at Alan, Idaho, just over the Washington state line, or on a convenient tract near Spokane, exact location to be selected this month. Spokane men are backing the new track.

San Francisco, Feb. 24—Contract has been let for a one-mile dirt track for motor racing at San Luis Obispo, Cal., to be completed by April 1, at a cost not to exceed $20,000.

"ASK 'EM TO BUY" CAMPAIGN

Seattle, Feb. 24—Showing of the famous "Ask 'Em to Buy" films will be the biggest feature of the spring activities of the Washington Automotive Trades Assn. in the county divisions. The films will be released to the state office March 15, and will be shown at meetings of all the county divisions.

INCREASE PEERLESS DIVIDEND

Cleveland, Feb. 24—Stockholders of the Peerless Truck & Motor Corp. are assured of a good dividend this year.

At a meeting of the board of directors held Feb. 16, it was voted to increase the dividend from $2 a share to $3 a share and it was declared payable one year in advance up to March, 1923.

The dividend is payable as follows: 75 cents March 31 to stockholders of record March 1; 75 cents June 30 to stockholders of record June 1; 75 cents Sept. 30 to stockholders of record Sept. 1, and 75 cents Dec. 31 to stockholders of record Dec. 1.

At the close of this meeting it was stated that business for the month of January and the first half of February was double the same period in 1921.

MASTER TRUCKS LOWER

Chicago, Feb. 27—Master Trucks, Inc., of this city, has made reductions in price on its line of trucks as follows:

	Old	New
1½-ton Model JW (Worm)	$2690	$2290
2-ton Model Z (Worm)	.....	2290
3½-ton Model A (Worm)	4190	3990
4-ton Model Y (Double Reduction Drive)	.....	4490
5-ton Model B (Worm)	5290	4990
6-ton Model DDT Tractor (Double Reduction Drive)	3740	3390

All the models excepting the 2-ton Model Z are made in different wheelbase lengths and may be had either with worm or double reduction drive. The prices are slightly different.

TEMPLAR RAISES PRICES

Cleveland, Ohio, Feb. 27—The Templar Motor Co., of this city, has announced that prices for all the company's models would be increased on March 6. The new and old prices follow:

	New	Old
Roadster	$2,025	$1,985
5-passenger	2,125	1,985
4-passenger	2,175	1,985

PREMO LOWERS PRICE

Birmingham, Ala., Feb. 27—The Preston Motors Corporation has made reductions in the price of the Premo car as follows:

	Old	New
Touring	$1295	$1095
Roadster	1295	1095
Coupe	1945	1750
Sedan	1995	1825

CRAWFORD PRICES INCREASED

Hagerstown, Md., Feb. 25—The Crawford Automobile Co. has increased the price of its two, five and seven-passenger touring cars from $2750 to $3000. The price of the coupe and sedan remains unchanged at $4500.

CORRECTION

In the Feb. 2nd issue of MOTOR AGE in the description of the new Moon 6-40 model the engine figures were given as 3⅛ in. bore and 3¼ in. stroke. These should have been listed 3⅛ in. bore and 4¼ in. stroke. This typographical error made it seem that this engine was of unusual design.

Lincoln Production to Be Limited to 50 Cars a Day

Ford Declares That He Has No Inclination to Dominate Automobile Market

DETROIT, Mich., Feb. 27—The following copyrighted interview with Henry Ford is carried by the International News Service:

"Some people seem to have the impression," said he, "as the result of the taking over of the Lincoln Motor plant that I intend to be a sort of a bull in the china shop in the automobile world. They are wrong. In taking over the Lincoln plant, my son and I agreed before we started that we would restrict output. The Lincoln plant is now making 15 cars a day. As orders are running, we could sell 200 a day. But we shall never make more than 50 Lincoln cars a day. Such are my present plans, and, so far as I know, they will not be changed. I do not believe that any one man should dominate the automobile world. I have no use for a man who wants to go to Heaven without taking anyone else along with him.

"The rumors that connect your name with negotiations to buy the Wills Ste. Claire and other plants are not true then?" he was asked.

"Absolutely not a word of truth in any of them," he replied. "Nor is it true that I am negotiating for the purchase of any railroad. The one railroad I have is all I want."

MEMPHIS BUICK DEALERS

Memphis, Tenn., Feb. 24—H. H. Bassett, president and general manager of the Buick Motor Co. of Flint, Mich., accompanied by E. T. Strong, general sales manager, was in Memphis recently to attend a meeting of all Buick dealers in Memphis territory. About 75 dealers were present. George Gillespie, branch manager for the Buick Co., believes that the coming of the Buick officials is a part of a program to cover the entire territory in preparation for a big 1922 drive. A luncheon was given at Hotel Gayoso and business prospects for 1922 were discussed. "January business of 1922 has exceeded considerably the business of January of last year and February has shown an increase. This is true, especially true in the extreme south where Spring has opened," said one of the Buick men.

HASKIN TIRE REPAIR PAMPHLET

Chicago, Ill., Feb. 24—An interesting pamphlet on the trouble shooting order for tire repair men is published by the R. G. Haskins Co. at 27 South Desplaines St., this city. This pamphlet includes a large number of questions on tire troubles and the answers. This pamphlet is intended for distribution to tire dealers and should be quite valuable especially to the smaller dealers.

Mason, Day and Bishop Make 1-Ton Road King Truck

Flint, Mich., Feb. 27—The Mason Motor Truck Co., headed by Arthur C. Mason, president and general manager, has been incorporated in Michigan with a capital of $500,000. The secretary of the company is Melvin C. Day, who has been closely associated with Mason for 18 years, and the treasurer is A. G. Bishop, a vice president of the General Motors Corp. The new company will manufacture in Flint a one-ton truck to be known as the Mason Road King.

While the complete specifications are withheld, it is known the truck will be powered with a Continental engine and will have Timken axles. It will sell around $1,000. The plant which has been purchased in the south end of Flint, has a capacity of 40 a day and the company expects to be running at capacity by midsummer. The new corporation is completely financed and no stock is on the market.

PHOENIX GOOD ROADS MEET

Phoenix, Ariz., Feb. 24—J. A. Rountree, Director General of the United States Good Roads Assn., the United States Good Roads Show, and the Bankhead National Highway Assn., has opened headquarters in this city to promote these three organizations that will meet in Phoenix April 24-29.

Road machinery, road material manufacturers and dealers are arranging to have exhibits.

Among the distinguished men that have positively accepted invitations to attend the convention are Secretary of Agriculture Wallace, Secretary of the Interior A. B. Falls, United States Senator Charles E. Townsend, of Michigan, and Ralph H. Cameron, of Arizona.

MYTHICAL COMPANY FORMED

Toledo, Feb. 25—Members of the factory management class of the University of Toledo, many of them foremen and superintendents of Toledo plants connected with the automotive industries, have formed a mythical $25,000,000 automobile company.

Under the direction of Frank U. Quillin, dean of the school of commerce and business, every step in the organization and operation of a giant concern is being discussed by experts in the different business aspects.

Dr. Quillin says the idea has proved that the factory executives' imaginations have not entirely atrophied in their association with cold, hard business facts.

NEW HAMPSHIRE DEALERS ORGANIZE

Nashua, Feb. 28—Automobile dealers in southern New Hampshire, with the larger number having their headquarters at Nashua, have formed an organization to protect and promote the interests of automobile and truck owners and dealers in their section of the state. At a meeting held at the Nashua Country Club the dealers discussed national, state and city laws and regulations, taxes, etc., and decided it was time to get together to try to prevent being overburdened by laws and taxes. The association elected as officers: Archie C. Pollard, president; Charles S. Henry, vice president; Forest C. Mercer, secretary-treasurer. An invitation to owners and dealers in cities and towns in southern New Hampshire to join will be sent out at once.

EXIDE CONVENTION

Boston, Feb. 27—Following a two-days' convention ending with a dinner at the Engineer's Club here, the officials of the Electric Storage Battery Co. announced that they were preparing a big campaign of national advertising to build up the business throughout the country. It was an optimistic meeting. There were representatives present of more than 200 service stations handling the Exide line.

CANADA HAS FEDERAL AID

Ottawa, Ont., Feb. 28—Agreements have been entered into between the various provinces of Canada and the Dominion government calling for the construction of approximately 2,823 miles of improved highways under the Canadian Highway Improvement or "Federal Aid" Act. The cost of this mileage will be $19,151,000. The Dominion aid already appropriated in connection with this program amounts to $7,700,000.

CHRYSLER WITH MAXWELL

New York, Feb. 27—Walter P. Chrysler whose resignation as a director and executive vice president of the Willys-Overland Co., was announced last week, said today that he had no announcement to make at this time concerning his plans for the future except that for the present he would devote all his time to the Maxwell Motor Corp., of which he is chairman of the board. It is not believed, however, that this situation will continue permanently.

Kentucky Dealers Organize Automobile Trade Assn.

Louisville, Ky., Feb. 27.—Automobile dealers of Kentucky who gathered here to attend the Fourteenth Annual Automobile Show, formed the Kentucky Automotive Trade Assn. and elected J. E. Kittrel, of Lexington, as president.

Other officers elected were:

First vice-president, W. A. Thomas, of Louisville; second vice president, E. A. Diess of Mason; secretary, Eugene Cowles, of Shelbyville. Directors elected are L. C. Willis, of Caneyville; Silas Macon, of Lexington; A. W. Williams, of Danville; C. S. Brown, of Lexington; W. S. Smathers, of Mt. Sterling, and S. J. Kinkead, of Lexington.

Offices of the new association will be maintained in Louisville, in the offices of the Louisville Automobile Dealers Assn. The officers elected will serve until a constitution and by-laws are framed, and an election held under them. This meeting will be called soon by the president. The object of the organization is to assist the automotive dealers throughout the state and stimulate trade in all automotive lines.

DRIVE FOR OWN BUILDING

Philadelphia, Feb. 24—The Automobile Accessories Business Assn. has shown its faith in the business by unanimously adopting a motion to put over a vigorous drive to raise a fund for securing its own building. Much enthusiasm was shown at the February meeting and more than 100 members attended.

SEIBERLING LOSES SUIT

Akron, O., Feb. 24—F. A. Sieberling has lost his patent infringement suit against the John E. Thropp & Sons Co. of Trenton, N. J. The Thropp Co. manufactures tire building machinery for about 60 tire companies in the United States.

Array of Cars at Baltimore Show

Lincoln Sales Plan Includes Elimination of Distributor

Dealers in Cities Transact Business Directly with Factory Rural Dealers with Ford Branches

DETROIT, Feb. 25—Completed plans for the distribution of Lincoln cars by the former Lincoln dealer organization and the Ford dealer organization finds wholesale business eliminated, all transactions with retailers now being handled directly through the Lincoln factory here or through the 35 Ford factory branches of the country.

Dealers in the metropolitan cities of the country do business directly with the factory, carrying their own stocks of cars and parts. In the smaller cities of the country the Lincoln dealers will deal with the nearest Ford branch, and will carry small stocks of cars and parts. In the rural districts the Ford dealers will sell Lincolns on commission, getting their cars from the branches as they sell them, but carrying no parts.

In the cities where there have been both Lincoln and Ford dealers, the latter will for the most part act as salesmen for the Lincoln, commissions being fixed to make this attractive. All servicing and the handling of trade-ins involved will be by the Lincoln dealer. Where the Ford dealer would handle the sale and trade-in, a larger commission is provided.

Production Direction by Lincoln and Ford Men

Production at the factory will be under the co-operative direction of Lincoln and Ford executives, Wilfred C. Leland, general manager, said today. It is not expected to name a new production head specifically for Lincoln, he said. This same co-operative idea applying to sales and production has been worked out to apply to every department of the two companies, he said.

The impression that Ford would dominate the new Lincoln organization and that Ford men would be installed to take over the active management of affairs has not been borne out. All inquiries at the offices of Henry and Edsel Ford as to Lincoln affairs have been referred to Wilfred C. Leland, and any official information on the developments at Lincoln have come exclusively from him.

One of the first steps of the reorganized company is to amalgamate the Holden avenue plant of the company with the main plant. This step was contemplated before the receivership and is now being put into effect. The Holden avenue plant formerly embraced the screw machine and frame departments. These are now being fitted into the scheme of progressive manufacture at the main plant and will result in large annual economies. As soon as all equipment is moved the Holden avenue factory will be offered for sale.

Production will be speeded up so that by March 15 it will reach 30 a day. This rate will be continued until a sufficient back-log of orders has been accumulated to warrant an increase. From time to time additions will be made to the plant to permit of the company making parts now bought. The manufacture of its own bodies is a detail that is being studied closely by the company.

Regarding the most recent claim by the government against Lincoln, W. C. Leland expressed confidence that this would be dismissed as soon as the facts were subjected to intelligent scrutiny. Harold H. Emmons, counsel for the company, is working with the receiver toward the dismissal of this, so that the disbursements to creditors on claims will not be delayed unnecessarily.

Transportation Data to Be Ready for Public in Spring

Washington, Feb. 25—Windsor D. White, representing the National Automobile Chamber of Commerce, conferred with transportation experts here recently preparatory to writing final draft of survey of motor transportation for joint committee on agricultural inquiry of Congress. The report was submitted to Chairman Anderson on Feb. 27 and contained data on all phases of motor transport and transportation. The report is almost exclusively statistical findings of facts and few conclusions are mentioned because of the desire to avoid controversy.

The survey covers relative costs of hauling farm products from farm to market; store door delivery by motor truck; use of motor truck at terminals and commercial uses. Data has been gathered from reliable sources and compiled under the direction of advisory committee of transportation section of the joint commission. This information will be used by the committee in its report on transportation questions as relates to agricultural bureau of public roads also assisted in this work, it is stated that the report will not be available for publication until April or May.

GOODRICH DEALERS MEET

Galesburg, Ill., Feb. 24—Feature of the Central Illinois auto show, which closed here this week, was assembly of 50 dealers from Goodrich Tire & Rubber Co. agencies throughout the district. Plans for the year's trade extension and urge to local dealers to connect up with the national advertising campaign of the manufacturing company were high points of the talks.

WILLYS SEVERS CONNECTIONS

New York, Feb. 24—John N. Willys, president of the Willys-Overland, Inc., has severed connections with virtually all his other interests to devote most of his time at Toledo to the development of Willys-Overland.

Parts Makers Said to Have $348 Car as Ford Competitor

Durant's Forthcoming Announcement Will Clear Up Details of Plan and Vehicle Construction

NEW YORK, Feb. 27—There has been much speculation within the industry for the past week concerning the exact meaning of the announcement made last week that "W. C. Durant, president of Durant Motors, Inc., has accepted a contract to build in quantities a 4-cylinder 5-passenger automobile to retail at $348."

While Durant headquarters steadfastly adheres to its determination not to elucidate this somewhat cryptic statement until March 9, there is reason to believe that when the explanation is made it will constitute a somewhat sensational chapter in the development of the industry.

When the facts are made known, according to the best information available, they will disclose that a group of prominent parts manufacturers have decided to enter the automobile building field with an assembled car that will compete with Ford.

It is from these parts makers, if this information is correct, that Durant has accepted the contract to produce in quantities a car with electric starter and demountable rims, that will undersell Ford. The chief talking point of this car will be fuel economy. Tests are said to have demonstrated that it will make many more miles per gallon of gasoline than will a Ford.

Details of the plan of operation are purely speculative. The terms of the contract are not known. It is assumed the merchandising as well as the assembling will be left to Durant. Neither is there any information as to where it will be put together but it is stated that a production of 1,000 a year will return a profit.

Specifications have not been disclosed but it will be powered with a Continental engine, it will have Timken axles and the electrical equipment will be Electric Auto-Lite.

The presumption is that the companies which have signed the contract with Durant are the same which recently announced the establishment of a chain of service stations throughout the country. The group included Continental Motors Corp., Timken-Detroit Axle Co., Brown-Lipe Gear Co., Borg & Beck Co., and Spicer Mfg. Co.

While the tremendous demand for such a car as has been developed in the Durant experimental laboratories at Long Island City would assure a heavy demand for parts in its assembly this is is only a part of the story.

If a car can be produced which will compete successfully with Ford, and that is the entire purpose of the plan, there will be a large and steadily in-

creasing demand for replacement parts. This demand would be filled through the chain of service stations which this group of manufacturers is establishing.

Henry Ford has been quoted as saying that he could afford to give his car away if he could get the parts replacement business. While this statement is exaggerated, it is based on truth.

With this fact in mind the men who will provide the unit parts for the new car are said to feel that they can afford to supply them at a price which will make possible a profit with sales made at retail at $348.

It is understood a similar announcement may be expected in the near future in regard to a truck and a light delivery wagon which are being developed at Flint by a widely known engineer and designer. This line, it is said, will combine mechanical merit with low price.

When the new Durant enterprise is launched some interesting announcements are expected in relation to additions to the personnel of his organization.

ILLINOIS ASSOCIATION GROWS

Springfield, Ill., Feb. 27—F. C. Zillman, secretary-manager of the Illinois Automotive Trade Assn., announces that the membership of the state organization has been increased by 200 during the past four months, placing the Illinois organization among the leaders of the state bodies. The many changes in the trade, incidental to the period of depression through which the automotive industry has passed, resulted in the loss of 150 members. This loss has now been overcome and the membership is now 50 larger than was the case a year ago.

NEW PARKING PLANS

Dallas, Texas, Feb. 24—A. Harris & Co., one of the largest department stores in the southwest, has inaugurated a new plan for relieving traffic conditions about its place. The company has reserved space for parking 200 automobiles at one of the downtown garages and customers of the store when in the city are invited to park their cars there without charge. The garage company keeps check of the cars parked through checks issued at the store and bills the company out for full payment at the end of every month.

SERVICE RATE IS REDUCED

Seattle, Feb. 24—Questions of labor charges in automobile service departments and repair shops are now receiving much consideration here. Until recently the uniform labor charge to the public has been $1.50 an hour.

During the past week one of the leading distributors announced a cut of 10 per cent, making a flat rate of $1.35; and three or four other dealers have announced their intention of following suit. The majority of dealers and shops feel that it would not be judicious to drop at present, and are holding to $1.50.

Full Time Production is Program in Detroit Plants

Maxwell and Dodge Bros. Are at Capacity Output—New Ford Truck in Sight

DETROIT, Feb. 27—Steady improvement in business conditions during the week found a number of Detroit manufacturing companies going upon full time this year. Notable among these is the **Maxwell,** the demand for whose new line is running higher weekly, with consequent stepping up almost daily in the number of cars manufactured.

Maxwell is working steadily toward the improvement of service conditions and has several plans under contemplation which will place its service upon a very high plane. It is probable that a number of factory controlled service stations will be located in important cities of the country so that owners may never be more than a few hours away from genuine replacement parts.

Ford Motor Co. has not entered upon a full time manufacturing schedule yet but orders are reported steadily increasing and full time will probably start early in March. **Dodge Bros.** is working at full capacity, the schedule being approximately 600 cars daily.

Though Ford officials deny the probability of the early announcement of a new Ford truck of 2 to 3 ton capacity, it is not denied that the company has a new truck fully developed which is to be introduced. Only market conditions are considered to be keeping the new vehicle under cover. A betterment in general business conditions by the late spring or early summer will most likely cause the truck to be announced at that time.

Reo Motor Co. has improved its line by adding many refinements, among which are included new fenders and a new frame, drum type headlights and polished aluminum dashboard controls and finishings. The cars thus equipped were not shown at either of the two national shows.

Dort Motor Car Co. has been given permission by the Michigan Securities Commission to sell 25,000 shares of no par value common stock at $20 a share.

WATERLOO BOY NOW $675

Waterloo, Ia., Feb. 24—The Waterloo Gasoline Engine Co. announces that the price of its Waterloo Boy tractor has been reduced from $1,060 to $675. This brings the price below the pre-war level.

MARTIN-PARRY CONVENTION

Boston, Feb. 26—Dealers and salesmen handling Ford and Chevrolet cars in the New England territory under the Boston jurisdiction participated in a series of conferences on sales and service last week arranged by executives of the Martin Parry Corp. The Ford men had two sessions; one session was for salesmen and the other for dealers. Thursday evening there was a banquet for the entire party at the Copley Plaza hotel. Friday was given over to the Chevrolet organization, with sessions for both salesmen and dealers, along the same line, ending with a dinner Friday night at the same hotel.

At the conference there were addresses by Joseph Ewing, assistant to the president of the Martin Parry Corp.; C. R. Evans, Detroit; William L. Loomis, manager of the New England Martin Parry branch; R. P. Jones, New England Ford manager; Mr. Essinger, assistant to Jones; George W. Hall, eastern regional director for Martin Parry, and W. S. Sills, head of the Sills-Chevrolet organization. All told, more than 500 participated in the events.

EXCISE TAXES SLUMP

Washington, Feb. 27—Collections of excise taxes on automobiles for the last six months of the calendar year of 1921 decreased $15,579,309.50 as compared with revenues from this source during the same period in 1920. A slump of $1,584,735.73 was reported to Bureau of Internal Revenue for Dec., 1921, as compared with the same month of the preceding year. The total receipts from the manufacturers' excise tax on automobiles, motorcycles, accessories, etc., during the last six months of 1921, amounted to $57,308,245.30, as compared with $72,887,554.80. The total receipts for the month of Dec., 1921, on these products, amounted to $7,336,088.75, as against $8,922,744.48 in Dec., 1920. These figures show that the excise tax is apparently defeating its purpose and that the revenues are constantly decreasing.

ADMITS TRUCK A COMPETITOR

Washington, Feb. 25—Need for a separate, impartial, individual transportation authority or body to determine whether motor truck or short line railroad may survive, was advocated today by T. C. Powell, of the Erie Railroad Co., in supporting the proposal of the Railroad Committee of the Chamber of Commerce of the United States, to create a commissioner general of railroads. Admitting that motor truck competition is a vital problem, this railroad official told the conference that "the automobile properly considered is an adjunct of the railroad; wrongly considered, it is a competitor." He insisted that it would be impossible for motor vehicles to force rail carriers out of business, although admitting this form of transportation rendered useless several hundred miles of short lines.

SEEKS WORLD TRADE

Toledo, Feb. 27—Plans for entrance into world trade has been announced here by Vice President R. E. Clingan, of the Bock Bearing Co. In conjunction with British interests, the Toledo corporation has organized the British Bock Bearings, Ltd., and has arranged for the construction of a complete plant at Glasgow, Scotland.

Republic Creditors, Banks Plan to Help Truck Co.

Chicago, Feb. 24—Committments aggregating $2,500,000 were represented at a meeting of creditors of the Republic Motor Truck Co., held in Chicago Feb. 17. All these committments were cancelled and the creditors without exception accepted the situation in the finest spirit. They are willing to take long time notes in payment for present debts and to continue to supply the factory with materials and parts as needed. As things stand at present there is but one possible source of trouble, according to Charles N. Gillett, vice president of the First National Bank of Chicago and a member of the bankers' committee in charge of Republic affairs. In November there was a note issue of $500,000 due, which was defaulted. More than $325,000 of this issue is now held by the banks, leaving the remainder, $125,000, as the source of possible trouble. A corps of men are now in the field taking up these notes as rapidly as possible and it is thought that the whole issue will soon be in bankers' hands.

The banks have agreed to furnish $250,000 in cash to the Republic as soon as the notes are no longer a danger. The company has $2,525,000 in excess of liabilities for immediate working capital. Gillett says that the future of the Republic is assured providing enough business can be found to keep things going after the present situation is straightened out.

DORRIS HAS NEW TRUCK

St. Louis, Mo., Feb. 24—The Dorris Motor Car Co. has added a one-ton model to its line of trucks, this being shown for the first time at the automobile show in this city. The new model is known as K-2 and has a four-cylinder engine, 4x5½, valves in the head, multiple disk clutch, Bosch magneto and Westinghouse starting and lighting system. The wheelbase is optional at 120, 138 and 150 in. Cord tires, 33x5 in. are used all around.

DAN R. WALLS DEAD

New York, Feb. 27—Dan R. Walls, advertising manager of the Splitdorf Electrical Co., died suddenly at his home here Saturday after having been overcome by carbon monoxide gas when he went to his garage to take out his car. Walls had been with the Splitdorf company for several years and was widely known in the industry.

MID-WEST REFINANCING PLANS

Indianapolis, Feb. 23—Plans for refinancing and reorganizing of the Midwest Engine Co. have been made public by Oscar R. Stevens of New York, secretary of the creditors' committee of local and outside banks that has had charge of the management of the organization since July 17, 1921. The plans in brief call for the organization of the company into the Midwest Engine Corp., issuing $4,500,000 preferred stock which will be held by the creditors of the Midwest Engine Co., issuance of 125,000 shares of common stock, 75 per cent of which will be awarded to present shareholders of the preferred stock of the Midwest Engine Co., and flotation of $3,000,000 of 7 per cent refunding bonds, of which but $1,000,000 are to be sold at once to supply working capital for the organization.

Portland Service Men Take Action to Protect Business

Portland, Ore., Feb. 27—The Portland Automotive Trade Assn. in meeting with considerable success in a campaign against the service men who do not support a permanent home for their business. The class of men the association is waging a war on is variously described as the garage parasite, the curbstone repair man, alley rat and the back yard mechanic. The steps taken by the association are as follows:

Men regularly employed in the shops of the association have been notified to discontinue Sunday work or after-hour work for hire.

At the insistence of the association, the city fire department has issued a general order prohibiting employees of the department from repairing automobiles in or around fire stations. A warning has been issued to other city employees in mechanical departments.

Cooperation of the jobbers and automotive supply dealers against selling this class of dealer at regular discounts has been obtained.

Iowa Garage Men Operate Under Strict Record Law

Davenport, Ia., Feb. 27—Newly enacted legislation places public garages under strict regulation and state authorities have warned county officers that strict enforcement of the law, intended to provide quick check up on motor thefts, will be expected.

The law requires each person or firm conducting a garage or repair business to keep for public inspection record of license number, engine or factory serial as well as the state license number of all motor vehicles in charge of the garage for rental, storage or repair. The owner must sign the record and if the machine is not taken in by him the driver must secure the owner's name as well as his own with street number.

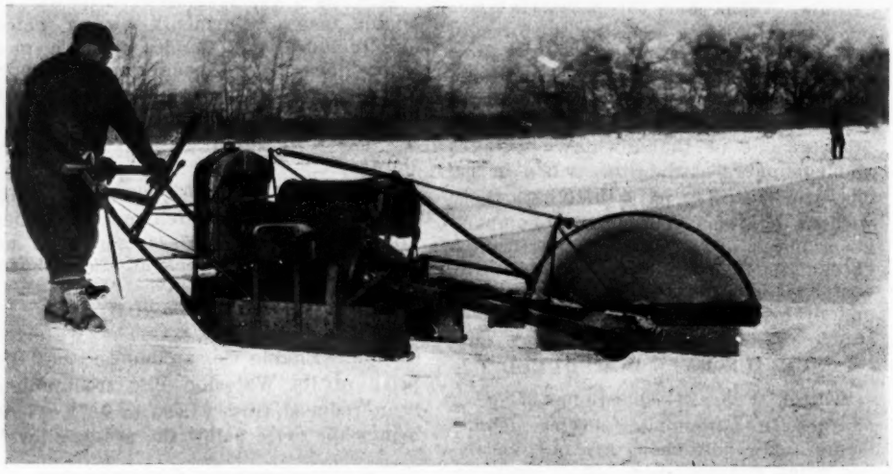
Alteration or obliteration of engine number is considered prima facie evidence of larceny and employes of the garage are liable for immediate notification to proper officers and to hold the machine 24 hours pending investigation. Second records are not required if the owner or driver is personally known to the garage man.

DODGE DEALER CONTEST

Cleveland, Feb. 24—W. Pitt Barnes, local Dodge dealer, was able to give $500 to the members of a winning team of used car salesmen in his organization and he says he never parted with money for which he received better returns.

The contest was staged in connection with the opening of the Dodge used car display and sales room and it opened Nov. 1 and closed Feb. 1.

Ice Cutting Machine Replaces 6 Men



NOT all the towns and communities of the lake regions of the north and northwest import their ice supply. Muscode, Wis., is a town that looks out for itself. Kratochwill Bros., authorized Ford dealers, fitted up an ice cutting machine, as shown in the accompanying photograph, that did the work of six men and one horse. The power unit is a regular Ford Model T engine; the saw is 40 ins. in diameter and will cut ice 17 ins. thick. The clutch and feed control is from the front. The engine runs on high when the saw is working. The machine is fast, very easy to handle and one man does the whole job. This successful ice cutting machine suggests sales for engines from wrecked Ford and other cars.

IN THE RETAIL FIELD

Chicago Garage Owners' Assn. held their annual dinner and dance on Feb. 15.

Peak & Co., Peoria, Ill., have been named new Haynes dealers in that city.

Stevens Clarke Co., Boston, exhibited the Rickenbacker car for the first time in Boston last week.

H. A. Seller Co. and Seller & Cummings have been incorporated in one business, to be known as the H. A. Seller-Cummings Co. They have the Frisco agency for Auburn, Dorris and Stewart truck.

Richardson Motor Sales Co., Memphis, has been awarded the Continental territorial sales rights.

Springfield Automobile Co. has signed up the agency of the Roamer car for the western Massachusetts territory.

F. D. Daniels has resigned as president and director of the Mitchell Springfield Co., agency for the Mitchell car in Springfield, Mass. F. G. Kirsch, treasurer, will continue the business, with some further changes indicated in the organization.

Gilbert C. Hall, formerly of the Miller Rubber Co.'s Springfield branch, has bought the interest of Charles A. Reynolds, of the Parsons-Reynolds Co., tire and accessory dealers, in Springfield, Mass.

Nash Garage, Fond du Lac, Wis., owned and managed by B. E. McCumber and Hale Dunham, has moved into a two-story building recently vacated by the Dodge agency.

Wisconsin Rapids Auto Service Co. is a new $25,000 corporation formed at Wisconsin Rapids as a consolidation of local interests holding dealer franchises from Hudson and Essex and International trucks and tractors. Officers are: President, William Knapp; vice president, C. L. Fry; treasurer, Mrs. William Knapp; secretary, A. J. Midthun.

Mulen Tire & Vulcanizing Co., Sheyboygan, is., has been designated as exclusive dealer and service station of the Goodyear Tire & Rubber Co. in that city.

C.T. Stein Co., Madison, is., specializing in rebuilding, trimming and repainting motor vehicles, has moved its offices and shop to where its floor space is much increased.

Ritter Automobile Co., Madison, Wis., Franklin dealer and district distributor, has purchased the Nevin Bldg., which it has occupied under lease for the past five years.

Waukesha Auto Sales Co. has been incorporated at Waukesha, Wis., with $20,000 capital to deal in new and used motor vehicles, equipment and supplies, do repair and service work, etc. The incorporators are A. A. Andrews, E. J. Burns and Nelson Steinman.

J. J. Stangel Hardware Co., Manitowoc, Wis., a large retail dealer, has established an automotive equipment department occupying about 30 per cent of the main floor space.

Hall & Reeser, Farmer City, Ill., have decided to open a branch at Clinton, Ill., and have rented a sales agency, with Harry Hall as manager. The firm distributes the Paige car.

James W. Wolf, Shelbyville, Ill., has sold his battery station to R. A. McCormick, of Flora, Ill., and the latter took possession Feb. 20.

Edward J. Wall, for several years identified with the C. P. Rockwell, Inc., Nash and Lafayette distributor for New England, has sold out his interest to take over the distribution of Nash cars for Rhode Island.

De Kalb County Motor Sales Co. has been organized at Sycamore, Ill., and articles of incorporation secured from the secretary of state. Capital stock has been fixed at $30,000. A sales agency has been opened.

H. J. Fetterhoff has sold his garage business at Freeport, Ill., to George Rowley. The latter was formerly employed as mechanic and now embarks in business for himself.

William Freede & Son, Decatur, Ill., is the name of a new firm organized to distribute the Chevrolet car in Macon county.

James E. Lewis, Aurora, Ill., has sold his interest in the Lincoln Automobile Parts Co. to Ralph S. Roscoe, and the latter will be associated with Darwin M. Taylor in the management of the company, specializing in tires and accessories for motor vehicles.

Indiana Truck Corp., Marion, Ind., has opened a parts depot and service station at Louisville, Ky. C. G. Barley, president of the Indiana Truck Corp., is president; W. E. Anderson, of Louisville, vice president, and I. W. Kenett, supervisor of sales promotion of the Indiana Truck Corp., secretary-treasurer and general manager.

J. E. Strauch, Washburn, Ill., has sold his garage and sales agency to David Dwyer and the former goes to Wheeler, Ind., to engage in farming.

M. M. Young, late of Chicago, has let the contract for the erection of a new garage at Gridley, Ill.

Bay Verde Machinery Co., Green Bay, Wis., jobbers of machine tools, wood and metalworking equipment, transmission supplies, etc., is establishing an automotive equipment department on a large scale.

Fred Mayer, Phillips, Wis., Dodge dealer, has plans for a new garage, display room and service building, estimated to cost $25,000 complete.

Tomahawk Motor Co. has been incorporated at Tomahawk, Wis., with a capital stock of $50,000, by J. A. Fitzgerald, E. M. MacDonald and C. P. Kelly. It will deal in motor vehicles, tractors, tractor implements, automotive equipment, do repair work, etc.

Norman Motor Co., Hurley, Wis., has started work on the construction of a $30,000 public garage, sales and service building. Alvin J. Norman is president and manager.

Appleton (Wis.) Motor Co. has sold its garage and service building and purchased the larger structure recently vacated by the August Brandt Co., Ford dealer, which is now located in its new $45,000 building.

North Side Garage, Hartford, Wis., owned by Douglas Ports and Albert Lotsch, has been appointed Reo dealer.

Rummele Auto Co., Sheboygan, Wis., Dodge dealer, has opened a branch sales and service shop in Plymouth, Wis., in charge of George Roux.

H. A. Drake Auto Co., Ladysmith, Wis., Ford dealer, has been given additional territory embracing the eastern part of Rusk county and has opened a branch house at Hawkins, Wis., occupying the former garage of Dvergadal & Lund. Victor Erickson has been appointed manager of the new Hawkins branch.

Merrill Buick Co., Merrill, Wis., will start work at once on the erection of a new sales and service building, to be ready June 1.

J. H. Brady, Madison, Wis., has let contracts for a new garage and repair shop building to cost about $17,500.

Gibson City Implement Co., of Gibson City, Ill., has been orpanized and will handle tractors and other power farming machinery. The company is incorporated with capital stock of $25,000. C. W. Newman, late of Champaign, Ill., and Kingsley Crosby, late of Watseka, Ill., are the principal stockholders and will operate the business.

W. T. Davis & Son, of Rockford, Ill., have purchased the T. E. McCutcheon garage in Oregon and renamed it the Black Hawk Garage.

Wisconsin Motor Car Co., Milwaukee, Jordan dealer, has opened an exclusive used car department in charge of J. E. Buckley.

Marmon-Louisville Co. has been appointed distributors of the Columbia Six line in Louisville territory. The Columbia was formerly handled here by the Grabfelder-Stern Motors Co.

Memphis Automobile Dealers' Assn. offices have been moved. The new office is the headquarters of the Memphis automobile dealers—a general information bureau as well as an employment department being maintained. S. H. Butler, president, and H. W. Osoinach, secretary.

Hubert Bushert has retired from the Bushert Bros. garage, Bethany, Ill., and his brother, Lester, will continue the business alone.

A. E. Severe, late of Peoria, Ill., has taken the agency of the Dodge Bros. car at Pekin, Ill., and will carry a line of accessories.

George W. Peak, for many years dealer for the Haynes car in Chicago, has moved to Peoria, Ill., and will be distributor of the same car for the counties of Peoria, Tazewell, Woodford, Stark, Fulton and Mason.

Knotts & Fisher, Hammond, Ill., has dissolved partnership, the latter retiring. Mr. Knotts was formerly automobile dealer at Decatur, Ill., going to Hammond two years ago to embark in the same business with W. E. Fisher. Mr. Knotts will hereafter conduct the establishment alone.

Wm. Hamacheck Buick Co., of Sheboygan, Wis., organized recently by William Hamacheck, for many years Buick dealer at Manitowoc and Two Rivers, Wis., has opened Sheboygan headquarters.

Dicke Motor Car Co., Manitowoc, Wis., Nash dealer, held the formal opening of its new $30,000 sales and service building on Feb. 8 and entertained 3000 visitors.

Breitbach Auto Co., South Milwaukee, Wis., Buick dealer, with a branch at Wawatosa, another suburb of Milwaukee, has been granted further retail selling rights to include the city of Milwaukee. Other city of Milwaukee retail dealers are the East Side Buick Co., West Side Buick Co., and the retail department of the Milwaukee branch of the Buick Motor Co.

Purcell-Wischan Co., Madison, Wis., has started work on a new sales and service building which will cost $125,000, including the site.

Thiensville (Wis.) Garage, Inc., is the name of a new corporation formed with $25,000 capital stock by R. A. Kellner, W. W. Rowe and August F. Kellner, all of Thiensville, to deal in motor vehicles, do repair and service work, etc.

Puritan Motors Co., agents here for the Lincoln, is being reorganized and Otis Funderburg and S. Hardy Mitchell will be the new firm handling Lincoln, Clarence C. Dow and J. T. Turner retiring.

Horace H. Ferguson and W. McRae Remington have just added another salesroom to "automobile row" in Buffalo. They will distribute the Chevrolet line.

Perry Garage, at Perry, N. Y., has been sold by Sedam Bros. to T. E. Mitchell, of Perry.

Bridgeport Dealers Plan to Save $150,000 on Trade-ins

Bridgeport, Conn., Feb. 24—Educating the public to accept a standard price on new cars and stabilized prices on used ones is the purpose of a campaign to be inaugurated by Bridgeport Automotive Assn. Erwin H. Jennings of the Erwin H. Jennings Co., Inc., and Fred L. Mills of the F. L. Mills Co. are now drafting a plan along these lines for early consideration by the association. The used car problem is characterized by Mills as an especially serious one at this time and outstanding in the financial difficulties that confront the automotive dealer.

He says that it has always been a drawback to the industry, but much more so now because those who bought cars at inflated prices during the years 1920-21 expect to receive high allowances now, when turning them in. Also, that people who usually buy used cars cannot afford to do so now, because of the existing industrial conditions.

Mills' estimate is that Bridgeport dealers have lost $150,000 during the past year in the used car business. Objective of the plan now under consideration is to assist the dealers and to be fair with the public.

PAIGE-JEWETT SCHEDULES

Detroit, Feb. 27—A preliminary report for 1921 made to stockholders of the Paige-Detroit Motor Car Co. shows shipments of 8698 cars last year, as compared with 16,090 in 1920. Sales aggregated $15,114,200 in value, against $26,864,300 in 1920. Profits from operations were $804,800, as compared with $1,422,300. Dividend payments on the preferred were $680,000 and on the common, $200,000, compared with cash dividends of $680,000 on the preferred and common in 1920. The inventory was reduced in 1921 from $6,018,700 to $3,594,701.

Schedules for the first six months of 1922 call for the manufacture of 13,170 cars, of which 7090 will be Paiges and 6080 Jewetts. This would mean shipments in that period of 4072 more cars than in all of 1921.

Directors of the company all have been re-elected and no changes have been made in the officers.

CONCERNING MEN YOU KNOW

Harry C. Hayes has been appointed branch manager of the Willys-Overland Co., and will succeed H. D. Knudson March 1. Mr. Knudson, who has been manager of the Seattle plant 12 years, has been sent to San Francisco to take charge of the branch there.

W. E. Pinfold, one of the pioneers of the motor car trade of Wisconsin, died at his home in Madison, Wis., at the age of 58 years. He was for many years engaged as a Buick salesman, later becoming associated with the Fox Motor Sales Co. He established the first motor livery in Madison, the state capital of Wisconsin.

John N. Willys, president of the Willys-Overland Co., believes in personal contact right on the firing line with the men who are selling the Overland and Willys-Knight cars. He is starting today on a tour of the Willys-Overland branches and distributors, which will include a number of the larger cities.

Edward J. Burnshaw, Jr., who recently resigned as general manager and treasurer of the Girard Automobile Co., distributor of Peerless cars, has been appointed sales manager of the Sweeten Automobile Co., Juniper and Cherry streets, Philadelphia, distributer of Lincoln cars.

Robert M. McCormick has resigned as vice president and sales manager of the Philadelphia Earl Co., distributer of the Earl car.

John H. Rosen, formerly general distribution manager of the Packard Motor Car Co., of Philadelphia, has returned to the Neel-Cadill Co., of that city.

Prince Adaschidze, of Georgia, an independent Balkan province, ha sspent a week in the Moline Plow Co. plant, Moline, Ill., purchasing supplies and interesting officials in establishing agencies there. Machinery is almost exhausted, he said, and the people, who look forward to early revival of their agricultural pursuits, will be wide market for American made goods.

Frank A. Seiberling, former Goodyear president, and his associates announce the following organization which will look after the interests of the new Seiberling Rubber Co: F. A. Seiberling, president; C. W. Seiberling, vice president in charge of purchases; I. R. Bailey, vice president in charge of sales; W. S. Wolfe, vice president and factory manager; W. E. Palmer, secretary and assistant treasurer; Wm. A. M. Vaughan, treasurer; H. L. Post, assistant sales manager; H. A. King, manager tire sales; O. H. Walcott, manager merchandise distribution; W. H. Oburn, manager credits; F. R. Griffin, manager advertising.

Burton Hiram Strickland, from 1896 to 1901 secretary and treasurer of the Springfield Rubber Tire Co., since the latter date an officer of the New Haven Savings Bank, died the 11th at his home in this city, following an illness of several months.

S. B. Bechtal, president of S. F. Bowser & Co., Inc., Fort Wayne, tank and pump manufacturers of this city, has gone to California and other western states on a business trip.

M. S. Carlton, formerly assistant advertising manager and publicity director of the Peerless factory at Cleveland, has joined the sales and advertising staff of C. H. Lines, Fort Wayne, distributor for the Peerless, Chandler and Cleveland cars.

Fred C. Zillman, secretary-manager of the Illinois Automotive Trade Assn., has been appointed salaried secretary of the Peoria, Ill., Automobile and Accessory Dealers Assn.

Thos. H. Smart, president of the Thos. H. Smart Motor Co., has assumed active charge of the Hupmobile and Stutz in Memphis. L. M. Dreeves, who has been sales manager for Smart for the past two years, has accepted a connection with General Motors. For the present he is located in St. Louis.

George C. Morgan, general sales manager of Earl Motors, Inc., Jackson, Mich., announces the appointment of Ira L. Boll as division sales supervisor of the middle west.

Arthur T. Stanton has joined the Maxwell Chalmers staff as director of service. For the past year Stanton has been Dodge distributor at Akron and before that had been connected at the Dodge factory, first as assistant to Arthur E. Barker, now Maxwell vice president in charge of sales, and then as general executive in foreign territory.

C. F. Tollzien, factory manager of the Packard Motor Car Co., has resigned to devote his attention exclusively to the business of the Plywood Products Co., of which he is president and which he organized two years ago. The Plywood Co. at Wayne, Mich., manufactures steering wheels.

Harrison McCarroll, division sales manager for the John Deere Plow Co., died last week in Des Moines, Ia., after a few days' illness. Burial was at his home in Ottumwa.

William C. Sargent, for 22 years secretary and also a director of Chain Belt Co., Milwaukee, died suddenly on Feb. 5 as a result of heart failure. He was 73 years of age and has been in ill health for several years.

Clarence A. Earl and members of the creditors' committee which is working out the refinancing of Earl Motors, Inc., were in New York recently for conferences with Percy Johnston, president of the Chemical National Bank. It is understood that nothing has developed to interfere with the satisfactory working out of the financial program and that the additional money needed undoubtedly will be subscribed.

F. C. Hermann, of Springfield, Mo., one of the heaviest stockholders in the Gillette Rubber Co., of Eau Claire, Wis., has been elected president of the corporation. R. B. Gillette continues as vice president and general manager. L. A. Fosse, of Chicago, who has been in charge of affairs in behalf of a bankers' committee for the past year, has relinquished his duties. Mr. Hermann recently disposed of most of his extensive business interests at Springfield to retire to California to live, but he has changed his plans and will take an active part in the management of the Eau Claire concern.

Leonard R. Hartill, tractor expert for the J. I. Case Threshing Machine Co., Racine, Wis., has sailed for Armenia, where he will superintend the assemblying and operation of a large number of Case 15-27 tractors, which have been sent to Armenia by the Near East Relief Assn.

Peter Meyer has been named manager of the second annual motors and sportsmen's show, Buffalo, to be held under auspices of the Automobile Club of Buffalo in the Broadway Auditorium April 10-15.

Edward E. Talbot, Springfield, Mass., has won the high school essay contest in Massachusetts, conducted by Harvey S. Firestone, tire manufacturer, being one of several thousand competing. The subject was that of better highways.

Lieutenant Governor Alvan A. Fuller, the veteran Packard dealer in Boston, has announced his intention to run again for the nomination as the second executive officer in Massachusetts. He will not have any great opposition and will get a much bigger vote than ever.

President J. N. MacAlman, of the Boston Automobile Dealers Assn., Stearns Knight distributor and J. W. McGuire, Pierce-Arrow distributor, and a director in the organization, are at Bellaire, Fla., getting ready for the motor show by recuperating. Joseph S. Donovan, Studebaker dealer, is also in the south for a brief rest, and John L. Snow, Peerless distributor, has just returned from a hunting trip in South Carolina, where he was accompanied by William J. Connell, former Overland distributor. John H. Johnson, Buick dealer, has been recuperating in the west, and will shortly sail for a Mediterranean cruise.

A. H. Petersen Mfg. Co., Milwaukee, announces the appointment of William G. Brown as general sales manager. Brown has been with the American Bosch Magneto Co., having resigned as western sales manager to take up this new work.

BURNS SLATED FOR PRESIDENT

Peoria, Ill., Feb. 25—At the annual meeting of the directors of the Illinois Automotive Trades Assn., the nominating committee for officers recommended B. B. Burns, of Decatur, for president to succeed H. B. Pinkerton, of Peoria, who has served since the state organization was formed. The annual meeting of the state association was also awarded to Decatur and the dates fixed for March 20 and 21.

TRANSPORT TRUCK CONVENTION

Mount Pleasant, Mich., Feb. 27—A three-days' sales convention was recently held at the Transport Truck Co. factory, Mount Pleasant, Mich.

Among those in attendance were: J. J. Eddy, Eastern Division; Geo. I. Gargett, Michigan and Indiana; W. A. Neilson, Southern Division; C. W. Holmes, Mid-Western Division; D. G. Westbrook, Pacific Coast Division; G. M. Rockwell, Southeastern Division; Edward Taylor, Ohio and West Virginia.

Akron Rubber Plants Busy Under Flood of New Orders

Working Forces Are Increased and General Conditions Best Since Depression

AKRON, Feb. 24—Tire production steadily is on the upgrade in Akron although there has been no outstanding spurt. All tire companies report Spring orders up to expectations but are not planning any substantial production increases for there is always a seasonal buying slump to follow the first spring buying spurt, and finished goods inventories are to be held at rock bottom and will not be materially expanded.

Akron, according to estimates of the rubber companies, is in better shape economically and financially than at any time since the beginning of the business depression in the early part of 1920. The tire industry itself is slightly above the peak reached in July of last year just prior to the second precipitate slump. Actual producing wage earners in Akron's major tire plants now number in excess of 30,000 as compared to a peak employment of about 28,000 reached in July, 1921, following the drop from 71,000 employes in May, 1920, to 18,500 in December, 1920.

Goodyear within the past two weeks has added 500 men and increased production to 22,000 tires daily. Miller is operating about 75 per cent of normal and Firestone continues its production ticket of about 20,000 tires daily. The General tire plant is running up to capacity. The Mohawk Co., officials report, plans for increased production this spring.

The Seiberling Rubber Co., controlling the Portage plant at Barberton, and the Lehigh tire plant at New Castle Pa., now has a combined production of 800 casings and 1500 tubes daily. Production includes the old line of Portage cord and fabric tires and the new Seiberling cord tires on which the sidewall is eliminated and replaced by tread stock running from bead to bead.

All general offices of the Seiberling Co. have been moved from Akron to Barberton. Seiberling's new cord tire is ready for shipment for spring delivery. Officials of the company report heavy orders for the new casing.

The Mason Tire & Rubber Co. of Kent confirms reports that it has booked orders from Henry Ford for from 15,000 to 20,000 tires a month. Under present plans the Mason plant's production will be doubled and will go to 5,000 casings daily on March 15. The company's annual report due next month is expected to show sales for the fiscal year of approximately $9,000,000 as compared with $7,000,000 in 1920. Net profit is estimated at $600,000. The Ford order is the first original equipment business undertaken by the Mason Co.

BUSINESS NOTES

Kelly Tire & Rubber Co., New Haven, Conn., bankrupt, has been under consideration for reorganization by a group of New Haven men who recently made an offer of $200,000 to Federal Judge George E. Hinman, which was rejected.

Victor Page Motor Corp., Bridgeport, Conn., will shortly employ 500 additional men at their Stamford plant.

Auto Parts Co. plan at Norwalk, O., was completely destroyed by fire, causing a damage of more than $25,000. Steps are being taken to rebuild the plant.

Buick Sales Co., Medina, N. Y., was another victim of fire recently, suffering a loss of $40,000. Harrigan and Hart are the owners of the firm.

Kokomo Rubber Co., Southern division, under its chain store system of distributing direct from factory to user, inaugurated by W. A. Harris, general manager, has increased to such proportions that it has become necessary to enlarge the Louisville plant, which is headquarters for the 10 states of the Southern division.

J. C. L. Krebs, formerly identified with the Clydesdale Motor Truck Co., of Clyde, has organized the Krebs Motor Truck Co., which proposes to establish a plant here.

India Tire & Rubber Co., Akron, O., has established a branch warehouse at New York City, where an adequate quantity of all India products will be constantly maintained.

Stewart-Warner Speedometer Corp. has made a settlement with the Government in an income tax controversy that has been pending for several years in which the company is saved payment of $2,000,000. The tax question involved the amount of exemptions carried by the item on patents and good will and the classification in earnings paid each year to the Stewart interests.

Auto Signal Co., organized last year at Sullivan, Ill., has been forced to suspend. Business men of the vicinity invested $32,000. The company was founded five years ago by F. E. Pifer and prospered for a time.

Serv-us Station Supply Co., Harris Trust Bldg., Chicago, is now serving the trade in the Middle West and Western states with a line of modern filling and tank station equipment. Their leaders are the Beacon Visible Motor Oil Dispenser and the Brookins all in one oil measure.

U. S. Tractor & Machinery Co., Menasha, Wis., has embarked upon a general expansion program following the assumption of the presidency and general management by J. M. Robinson, formerly of the International Harvester Co. and other large tractor and agricultural equipment manufacturing concerns. It is planned to start work early in the coming spring on the erection of additional machine shop and assembling units, and a new foundry, so that not only the output of tractors will be increased but provision made for producing a more extensive line of tractor implements and power farm equipment.

Eagle Mfg. Co., Appleton, Wis., manufacturer of the Eagle tractor, feed cutters, etc., has effected a considerable increase in its production, which has been at a minimum for some time past. In so doing, it is arranging to establish several new lines of power farm operating equipment which it has been developing in recent years. A. W. Priest is president and Charles Hagen is general manager.

B. F. Goodrich Co. assets were reduced from $138,910,112 in 1920 to $89,031,229 at the close of the past fiscal year on Dec. 31, 1921, according to the company's annual audit and balance sheet. Assets in 1919 were listed at $175,715,000. The company's inventory has been brought down from $54,184,000 in 1919 and $72,631,142 in 1920 to $29,618,938, while the surplus has been reduced from $22,706,499 in 1920 to $10,194,527. The loss sustained by the company in 1921, of $8,983,401, carried to surplus account, is responsible largely for the heavy surplus shrinkage.

Knox Tire & Rubber Co. property at Mount Vernon, O., will be sold at public auction at the county court house in Mt. Vernon, O., Feb. 25.

Soss Mfg. Co., of Brooklyn, N. Y., announces that it has discontinued its policy of granting sole distribution on Soss Grip-Tite Curtain Lights, and will immediately seek desirable jobber connections.

Champion Ignition Co., Flint, Mich., manufacturers of the A. C. spark plug, will be known as the A. C. Spark Plug Co. after April 1, according to an announcement made by B. DeGuichard, vice president and general manager of the company.

Storm King Mfg. Co., Omro, Wis., manufacturing winter tops, curtains and other protection devices for open passenger cars and motor trucks, has moved its plant and business to Hortonville, Wis.

Simplicity Engine & Mfg. Co., Port Washington, Wis., has perfected and is now engaged in quantity production of a new design of portable boring and regrinding tool combining the two approved methods of fitting motor blocks with new pistons.

H. & D. Mfg. Co., Racine, Wis., has been incorporated with a capital stock of $10,000 to manufacture and deal in pistons, piston rings and other gas engine and general automotive equipment and specialties. The incorporators are Martin Horeth, Walter D. Draeger, Joseph F. Dodd and Charles Jenista, all of Racine and for many years connected with automotive plants and engineering shops.

H. H. Franklin Mfg. Co., Syracuse, announces that it has built up a reserve supply of Franklin cars to help meet the seasonal demand which is expected in March and that as a consequence its production schedule has been reduced from 40 cars a day to 30 cars a day.

Stratford Specialty Co., Stratford, Conn., to deal in automobile tires and accessories, has been incorporated with an authorized capital stock of $15,000. The incorporators are Joseph Roberts, Frank Gabbranelle, Gaetano Geardini, Benvenuto Carboni, Tony May and Pretro Franceschini.

Windsor Garage, Windsor, Conn., has been incorporated with an authorized capital stock of $10,000. Incorporators are John A. Bouvier, F. D. Longley and Henry S. Loomis.

Racine Auto Tire Co. is separate and distinct from the Racine Rubber Co., also of Raicne, Wis., which, owing to some similarity of name, has frequently been confused with it. The Racine Rubber Co. is owned by the Ajax Tire & Rubber Co. and its products are known as "Racine Tires." The product of the defunct concern is known as the "Horseshoe Tire."

Roll Mfg. Co., Fond du Lac, Wis., manufacturing gas filters and similar specialties, is defendant in involuntary bankruptcy proceedings. Edward R. Roll is president.

Receiver Boom of the Republic Rubber Corp., Youngstown, O., announces the sale of $1,000,000 receiver's certificates recently authorized by the U. S. court.

Federal Truck Co. shows surplus of $704,828.24 as of Dec. 31, 1921, with total assets of $3,533,325. Sales amounted to $3,268,467.65 during the year and net profit was $176,800.09. Cash on hand was $165,301.11, accounts receivable, $258,208.87.

Automotive Parts Co., Columbus, O., capitalized at $250,000, has been organized by Columbus capitalists to operate a wholesale business in parts and accessories. H. C. Root, for the past eight years general manager of the Westcott Motor Car Co., is president; Ernest M. Pavey, receiver for the Monitor Motor Car Co., is vice president. Root will also be general manager of the business. The concern will have exclusive selling rights in Ohio for Continental motors, Timken axles and bearings, Warner transmission systems, Borg & Beck clutches, Spicer universal joints and other parts.

Charles G. McCune, Columbus, O., formerly in the automobile business and doing business as the Charles G. McCune Co., has filed a petition in voluntary bankruptcy with liabilities listed at $53,890. Promisory notes form the bulk of the liabilities and consist of $47,500, held by J. M. Gerard. There are practically no assets.

Lincoln Motor Co., recently bought by Henry Ford, has awarded to the American Body Co. of Buffalo a million-dollar contract for the construction of bodies for the new four and seven passenger Lincoln motor cars, officials of the American Body Co. have announced.

Sydney Player, Joseph N. Bethol. Richard S. Staples, Herbert S. Inge and Alfred Box, formerly Taft-Pierce officials, have reorganized the Warren F. Fraser Co., Westboro, Mass.

R. C. Kurtze, a member of the engineering staff of the A. O. Smith Corp., Milwaukee, has been granted letters patent on a new design of internal combustion engine which is attracting attention from automotive engineers and other mechanical experts. The engine operates on compressed air, steam, gasoline, kerosene or distillate. Irrespective of the number of cylinders, it has but one combustion chamber and uses a single spark plug and is entirely under throttle control, similar to a steam engine, making transmission systems unnecessary. Kurtze is developing the design for use in propelling motor vehicles and expects soon to have a model ready for installation in a demonstration chassis.

CADILLAC EMPLOYING 7000

Detroit, Feb. 28—The Cadillac Motor Car Co. reports that it now is employing nearly 7000 men in its factory and that its production schedule is larger by 20 per cent than is usually the case at this time of year.

Steinmetz Electric Truck In Brooklyn Climbing Test

Designer's O. K. on Vehicle Promises Speedy Production at Baltimore Plant

NEW YORK, Feb. 27—Taking a few hours off in between the sessions of the American Institute of Electrical Engineers, Charles P. Steinmetz, chief consulting engineer of the General Electric Co., and chairman of the Steinmetz Electric Motor Car Corp., witnessed a hill climbing demonstration of his electric truck on one of the steepest hills of Brooklyn. This vehicle has been in the process of design for several years and the Steinmetz O. K. on the plans promise speedy production at the plant at Arlington, Baltimore.

The present model has a capacity of 1500 lbs., and is rather remarkable for its simplicity, freedom from freak design and its abundance of power. The feature which is expected to do so much to bring the electric to the foreground is in the motor and rear axle. Other parts of the car are of a conventional design.

Gear Reduction Problem

Since he first became interested in the electric vehicle, Steinmetz has attacked the motor and gear reduction problems as those which were the most poorly adapted parts of the chassis. The high speed at which the electric motor operates efficiently makes it necessary to have a high gear reduction, which is objectionable in this kind of a vehicle. His first designs called for a revolving field rotating in an opposite direction to the armature. This was found to be impractical from a service standpoint and the gear reduction is accomplished in this latest design in a double reduction spur gear axle of which the motor is a unit part.

Price Near $1,600

While no definite price has as yet been set on the vehicle, it is said that it will probably be near $1600 for the chassis. One of the innovations in electric truck merchandising will be the adoption of a standard battery so that when the price is determined, it can be quoted. Past practice has been to have so many options in battery and equipment that no very definite price can be held in the mind of the purchaser or prospect.

The truck is fitted with pneumatic tires, 33x5 in. There is a hood in front of the driver's seat, resembling very much the hood on a gasoline truck. A portion of the battery is contained under this hood and another portion is under the driver's seat. Both sections of the battery are contained in trays and can be rolled out of the car in a very few minutes by simply disconnecting the leads and loosening the clamp bolts.

The Readers' Clearing House

Questions & Answers on Dealers' Problems

Method for Handling Oil in Garage

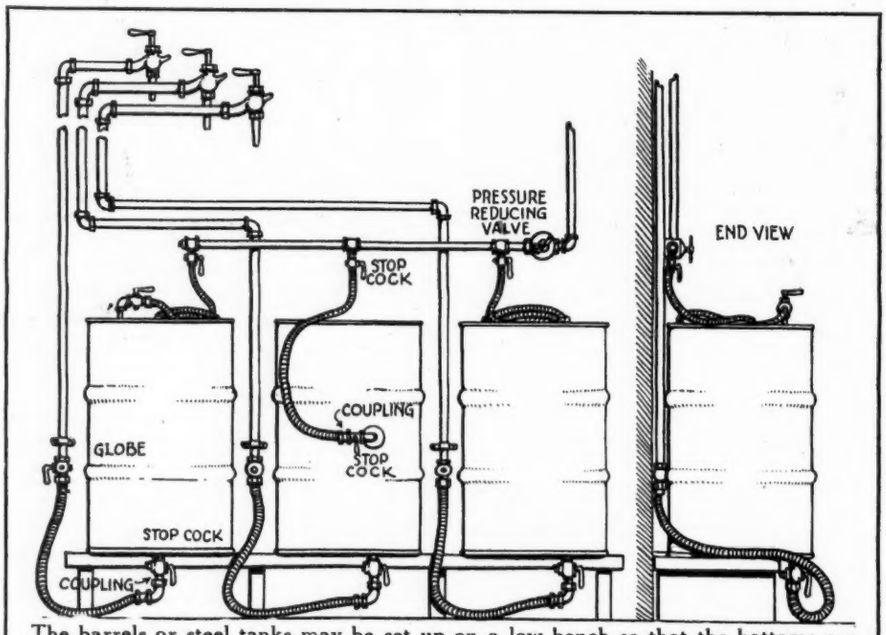
Q—Will you kindly advise proper method for handling lubricating oils by the air pressure system? I am erecting a new garage and intend to use this system, storing the oil in the basement.—E. C. Fenecke, Nanuet Garage.

To handle the oil with air pressure it will be necessary to get it in steel barrels or transfer it from wood to steel containers before connecting up to the air pressure.

Wood barrels will hold the oil without leaking but when enough pressure is applied to raise the oil the necessary 8 to 20 ft. to the taps, the barrels will leak oil or air or both between the staves. At 8 lbs. pressure the head of a barrel would have a pressure of about 2500 lbs., while the hoops would be subjected to an average of 4500 lbs. each. A 4 inch stave would have to hold upward of 1000 lbs.

Our sketch shows a method of connecting up the barrels to the air line and to the oil delivery pipes. The delivery pipes should be ¾ inch, but the connections should be small, ⅝ inch would be ample. For each connection a nipple, a stopcock and a coupling will be necessary. The nipple with the stopcock attached should be screwed in the barrel, then it is turned over and the coupling on the end of the armored hose connected. After this is done the stopcock in the delivery pipe is opened. The air connections are made the same way either at the top of the barrel on in the side.

The air line should be provided with a reducing valve so that the pressure can be maintained just right to raise the oil without an undue amount of trouble.



The barrels or steel tanks may be set up on a low bench so that the bottoms are off the floor. This arrangement with the armored hose connections is very flexible

DRIVERS' LICENSE IN OHIO

Q—Is a private driver required to have a driver's license in Ohio? How can a person secure this kind of a job?—Forest Cripe, Toledo, O.

Section 6302 of the Ohio General Code providing for the licensing of chauffeurs in your state makes no distinction between private or public drivers of motor vehicles. It says "A person operating a motor vehicle, as chauffeur, shall file, by mail or otherwise with the secretary of state, or his duly authorized agent, upon blanks prepared under the authority of the secretary of state, an application for registration, * * *." The act provides that the applicant be over 16 years of age and must pass an examination as to his qualifications. Applicant must be of sound mind and memory and physically competent to operate a motor vehicle and the application must contain a description of the car one is competent to operate. These are the salient facts for obtaining a license. The fee is three dollars in Ohio and a badge is given.

Now in securing this kind of a job you will have to present your prospective employer with proof that you are a licensed driver. Locating that prospective employer requires just a little of that human ingenuity that makes American business men known the world over. Some employers use newspaper ads, others the employment agencies, others through inquiries among friends, etc. The successful applicant makes contact in some manner.

The Readers' Clearing House

THIS department is conducted to assist dealers and service station executives in the solution of their problems.

In addressing this department, readers are requested to give the firm name and address. Also state whether a permanent file of MOTOR AGE is kept, for many times inquiries of an identical nature have been made and these are answered by reference to previous issues.

Inquiries not of general interest will be answered by personal letter only. Emergency questions will be replied to by letter or telegram.

Addresses of business firms will not be published in this department but will be supplied by letter.

Technical questions answered by B. M. Ikert and P. L. Dumas; Legal, by Wellington Gustin; Paint, by G. King Franklin; Architectural, by Tom Wilder; General Business questions, by MOTOR AGE organization in conference.

PROPER PROCEDURE FOR PAINTING

Q—Would there be any damage done to a Ford coil if a spring was set up under the vibrator so it would make a better contact with the upper contact point?

2—When painting a car, what is used to rub it down? How long does it require rubbing, and is the paint allowed to dry before rubbing or is it rubbed immediately after painting?

3—What kind of paint is used for the last coat to give it its mirror like finish?

4—When painting an old car, should the old paint be removed?—Claude Press, Blue Ridge, Texas.

1—This practice is not recommended, not only because it causes excessive current consumption, but it also will destroy the synchronism of the vibrator.

2—Pummy and water are used to rub down the various coats on painting an automobile body. Rubbing of the surface does not commence until the first coat of color varnish is put on. After the first coat of color varnish is applied it is allowed to dry for 48 hours. The surface is rubbed with pummy powder

and water on a felt pad, knocking off the gloss and as much of the dirt specks as possible without rubbing through. The pummy is then all washed out.

3—The last coat usually applied is a coat of finish varnish.

4—To secure a durable finish it is advisable to burn off the old paint and sand the body carefully with No. ½ sandpaper. We would suggest that you secure a copy of June 30 issue, 1921 MOTOR AGE, in which there is outline of the operations and materials necessary in repainting an automobile.

TEMPERING SPRING STEEL

Q—Advise the best oil to use for tempering Bernot steel, for use as automobile springs.

2—Advise the temperature at which it should be tempered and any other information you can give us.—Union Motor Company, LaGrande, Oregon.

1—Any of the well known spring tempering oils or fish oils are good for this purpose. The H. F. Haughton No. 2 oil is recommended by the Crucible Steel Co. of America. This oil can be purchased from any railroad or blacksmith supply house. We have never heard of Bernot steel, however, we shall give you information that can be applied to most of the well known alloy steel spring materials.

The steel should be quenched at a temperature ranging from 1475 to 1550 degs. Fahr. This quenching should be done in oil. The second quenching should be given at a temperature approximately 50 to 75 degs. lower than the one previously given. The steel should then be drawn at a temperature from 850 to 1025 degs. Fahr. All spring steel should be drawn back in a suitable low temperature furnace maintained at the proper temperature.

The steel should be kept in the furnace for a time sufficient to allow of uniform heating throughout. Lead baths and salt baths are also used considerably for this work. For drawing the temper it is never advisable to use the process known as flashing. If you will supply us with the chemical composition of this steel we shall be able to give you more accurate details regarding the temperature at which the steel should be drawn and tempered. The figures given are only approximate and are based on average used on the average alloy spring steel.

2—Refer to number 1.

Garage Plan Suggestion for Storage, Repair and Accessory Sales

PLAN NO. 388

Q—We are sending you a sketch of a lot on which we propose to build a new garage. The ground is level. The building is to be one story, of cement block, and we would like a rounding roof with no supporting posts and plenty of skylights, especially in the repair shop, which is going to be in the rear of the building.

We would appreciate your advice for the most convenient arrangement of the following: small office, accessory salesroom, ladies' restroom, and smoking room for men. We wouldn't like to spare much room for the above-mentioned departments, as we want all the space possible for storage. We wish to have the front of the building attractive, but not too expensive because our capital resources are limited.

In the repair shop we expect to employ 3 or 4 mechanics. Our accessory stock will be about $500, mostly for tourist trade. We want a driveway all the way from Main street to alley, as there is no chance to build side entrance into the repair shop. We are going to make small excavation for steam heating plant. Where would be the best place for it. We would also like to know if you can give us estimate of the cost of the building complete, not including service equipment or machinery.

We will appreciate any advice you can give us.—City Service Garage, Iron City, Wis.

Perhaps we have given more space to the accessories store, office, etc., than you will think necessary, but the most you could gain would be space for two more cars, and that only by combining the store and office and making it so small as to be rather cramped. The sketch to the left of the main plan shows such a scheme.

Since vehicles will have to pass through the shop to get to the alley exit, it would be better to discard the alley doorway because of the waste necessary to maintain this aisle space.

It would be alright to have the doorway, but it should be used for emergency purposes only, and not as a thoroughfare. Place it to one side as indicated, rather than in the center. That will give more space for machine equipment.

The round trussed roof is most cheaply obtained by the use of the circle top-lattice truss. Here they would be spaced 15 ft. on centers, with the roof joists placed directly on them, and the roof boards nailed diagonally so that the bend is not quite so severe.

Cement blocks make a very good building material for walls, but they are anything but attractive. If you could build the front of some sort of nice looking face brick, it would attractively add to the style.

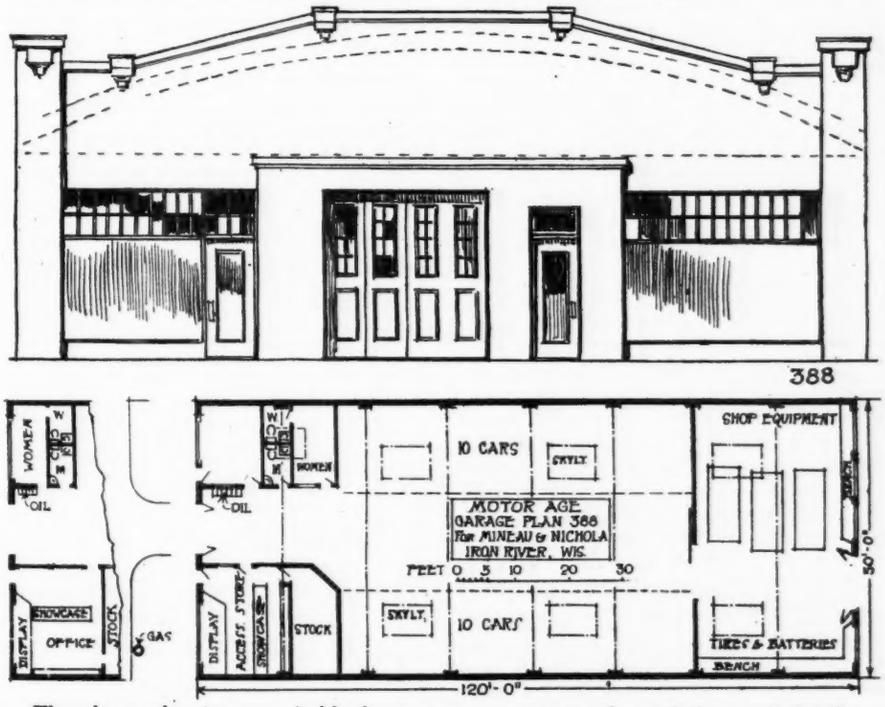
If we are not mistaken, the country in your vicinity is littered with a great profusion of granite boulders; these, if handled properly would make a very beautiful and striking front and one that would appeal to tourists.

It would be of no use for us to try to estimate the cost of this building, since costs vary so greatly and since building activities are undergoing such a strenuous change at the present time. If you will make out your specifications and give them to three or four contractors to figure, you will soon know more than our estimates would tell you.

You had better get more than one figure, too, but be sure to give them all the same specifications. To show how elusive costs are, the writer recently got bids on 12 doors from several mills.

The prices ranged from $90 to $189 and illustrated the difficulty of getting much of a line on costs. This building should be built for between 20 and 30 cents a cubic foot. In a big city, you might get even below 20 cents. At 20 cents, the cost would be $20,000.

There is no particular place that is best for the boiler room. Wherever it is easiest to get coal in and ashes out and where space can be spared for the stairway, is the logical place.



The above plan is one suitable for a storage garage and repairshop and for the sale of accessories. No provision has been made to display cars. NOTE—If you have a building or remodeling problem of any kind send it to Motor Age for solution

Third Brush Location and Adjustment on North East Generator

Q—A 1920 Ford starts good and runs fine until it begins to labor, then, after laboring for about two minutes, it backfires in the carbureter. All lines were cleaned, float in good condition and ignition is good. What is the trouble?

2—Why it is that the third brush on the North East AutoLite and Ford it set about halfway between the main brushes and to increase the charging rate it is moved in a direction of the negative brush, when they are positive brushes? Is it because they are four pole machines and there is a neutral point between each pole? Is that the reason the main brushes are not set 180 degs. apart?

3—By writing to the different carbureter companies and asking for their explanations and cuts of their carbureter, will they send them?

4—Supply the address of some home and farm electric lighting plants and also some manufacturers of 32 and 110 volt generators.—E. H. Plummer, Webster, Wis.

1—This trouble is caused either by leaking intake valve, improper timing or a poor grade of spark plugs. We would suggest that you carefully check over the seating of the valves, also the timing of the valves and the ignition, if these are found in good condition install a new set of high grade spark plugs.

2—The operation of the third brush system in a four pole starter-generator or generator is identical in principle with that of the two pole machine. The chief practical details wherein the four pole machine differs from the theoretical two pole consists in the distribution of the magnetic circuit through the armature core; the arrangement of the electrical circuits of the armature and the location of the brushes on the commutator.

The four-pole field contains two north poles and two south poles arranged alternately; north, south, north, south. This results in four distinct magnetic circuits through the armature instead of two, as in the case of the two-pole machine. Each of these four magnetic circuits contain only half of the total number of lines of force issuing from or entering into any one pole piece.

There are, therefore, four half strength fields which altogether contain a total number of lines of magnetic force that is just twice as great as was the total contained in the bi-polar field of the two poles generated. Because there are four distinct magnetic circuits to the armature core the number of parallel paths for the electric current to the armature core has been increased from two to four. This causes such a re-distribution of the inter coil voltages that the voltage across the main brushes becomes equal to the sum of the inter coil voltages in ¼ of the armature.

The voltage across the third brush and the negative trailing main brush is the sum of the inter coil voltages in the portion of the armature that lies between the third brush and the negative main brush, this portion being ⅛ of the whole armature. This redistribution of the armature circuits necessitates a relocation of the brushes so that they will be situated at the proper and neutral points on the commutator. These brushes are therefore located at right angles to each other, and since the armature contains four parallel paths for the current four brushes instead of two can be used.

It is also possible to use two brushes on this same four-pole machine. In the two-pole machine it is assumed that the leads from the armature coils come straight out from the coil slot to the commutator bar and therefore the main brushes were located midway between the two-pole pieces and the third brush in front of one of the pole pieces. In practice, however, the armature coil leads are brought from the slot to the commutator bar at such an angle that the main brushes have to be located in front of the pole pieces. To secure better mechanical construction the third brush in actual practice is located between the two omitted main brushes instead of between the two working main brushes.

For theoretical purposes it should be shown operating in conjunction with the omitted negative main brush as has been before stated. The voltage across the shunt field winding being dependent upon the sum of the inter coil voltages and the section of the armature between the third brush and the omitted negative main brush is subject to the influence of the armature reaction. The effect of the armature reaction becomes greater as the shunt field flux is cut down with an increase in speed, the shunt field current and likewise the field strength which are governed by the voltage across the shunt field windings will thus be affected indirectly by speed changes.

Therefore the terminal voltage and the generator output will be properly controlled. When the third brush is moved away from the omitted negative main brush additional armature coils are included between the two brushes and naturally the sum of the enclosed inter coil voltages becomes greater. If, however, the third brush is moved nearer to the omitted negative main brush the number of armature coils enclosed between the two brushes is diminished and the sum of inter coil voltages in the enclosed distance then becomes less.

3—Yes.

4—This will be supplied you by letter.

ON AUTOMOBILE POLISH

Q—Can you advise me regarding an automobile polish which I understand from the advertising restores the original finish.

If this polish is to take the place of a paint job, what do you think of it?

I have a 1920 K-Buick which now needs painting of the body and hood. What would you advise? What paint should I use or will varnish help?—D. E. Fitton, Battle Creek, Mich.

There is no polish made that will take the place of a paint job and any manufacturer who so advertises his goods is in the "patent medicine" class.

Polish is of use only when the original high body finish has become dimmed.

If the paint coats on your car are not cracked and show good color they can probably be revived by a coat of finishing varnish. If they are not cracked, but faded, they can be revived by what the automobile painter calls color varnishing. If they are cracked the old coats should be removed and the work done over.

The fenders on the car have been finished with a baked-on enamel and this accounts for their good condition. They can be revived by polishing.

Except on such baked-on enamel surfaces it is well to avoid polishing, and when the luster on the body begins to dim revive it with a coat of finishing varnish. Paint coats can be preserved indefinitely if they are kept under finishing varnish. It is difficult to advise you definitely just what to do as this will all depend on the condition of the surfaces, but if the paint coats are good varnish them.

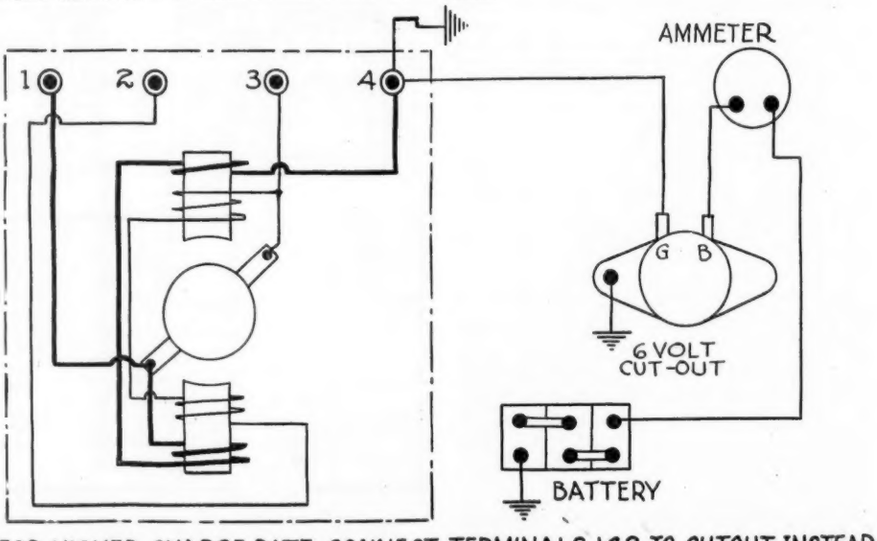


Fig. 1—Changes in generator and cutout connections necessary when converting a 4-volt system to use 6-volt battery

MIXING OF LUBRICATING OIL

Q—Would any harm be done by mixing Mobile oils and Veedol oil of medium body? What I mean is buying one oil at one town and another oil at the next town.

2—What is the harm in using two kinds of oil in an engine when same body of oil is used?

3—Is a Dodge engine receiving oil enough as long as the oil pressure gage works, if the oil is low in the oil pan?

4—What is the best oil made?

5—Is oil of medium body too heavy for a Dodge engine?

6—What is the best theft lock to put on a car? One that locks the gas off or one that you put on the wheel?—Gerald F. Hoffman, Princeton, Ill.

1—No. No harm will result if both oils are standard makes and equal quality.

2—Refer to number 1.

3—Yes.

4—This is a question that is not within the scope of MOTOR AGE to answer, and even though it were it would be quite difficult to arrive at any definite oil that is markedly superior to any other. There are no secrets to manufacturing oil as the quality of the oil is determined entirely by the policy of the company manufacturing same.

5—Oil of medium body is recommended by the Dodge factory for use in the Dodge engine.

6—Both of these methods of locking have their advantages. Of course, it is possible to steal a car with both types of locks if enough time is spent on the job. Regardless of how the gasoline is locked off, unless the lock is some place in the tank the lock can be bridged with a piece of pipe and hose. In the case of the steering wheel lock the lock could be destroyed by a method of drilling and inserting a pin then steering could be accomplished or an entire new wheel installed. Both of these methods are impracticable and the car is practically safe from theft with either safeguard.

VARIETY OF DODGE QUESTIONS

Q—Want to install Hudson valves in a 1917 Dodge, advise whether it will be necessary to shorten them and give diameter of valve head.

2—Have end play in clutch. Will this need new bearings in front end of transmission and flywheel?

3—Have a noise in clutch collar. Will this require new parts? If so do you know Dodge part numbers?

4—Would like to have the second speed run more silent. Do you think countershaft pin on which gears are pinned will need replacing?

5—The new Hudson has clutch disc springs. Can these be installed in a Dodge clutch?—Wilford A. Barth, Detroit, Mich.

A-1—The diameter of the Hudson valve is 1 13/16 and the length is 6⅞ in., which is the equivalent of .875. The diameter of the Dodge valve is 1.6875 in. and the length over all is 6.531 in. It is apparent from this that you will be forced to shorten the Hudson valve stem.

2—The end play can be removed by inserting washer number 5030 just ahead of the clutch shaft bearing at the front end of the transmission. This will necessitate the removal of the transmission and if the end play is not greater than one-eighth inch it will do no harm. All bearings should be examined and if signs of wear are shown they should be replaced.

3—This will require replacement of the clutch release bearing. Dodge numbers B4660.

4—This noise is probably due to wear in the second speed sliding gear or the countershaft bearing. If the noise is very noticeable the gear itself is to blame and should be replaced.

5—The new Dodge clutch is equipped with springs to facilitate separation of the clutch disc. These springs can be secured from the Dodge agency.

WIRING DIAGRAM OF COLE AND KISSEL

Q—Please publish wiring diagram of 1916 4-cyl. Kissel. The ammeter being burnt out and of large size, our customer wishes to replace it with a smaller and cheaper one. Could a Ford ammeter be installed?

2—Please publish wiring diagram of 1913 4-cyl. Cole. This car has a 24-volt battery. How could we change that to a 6-volt system? We wish to make this into a service car.—N. Sorensen, care L. S. Donaldson's Garage, Minneapolis, Minn.

1—Any ammeter will do, the Ford type being O. K. The diagram of the 1916 4-cyl. Kissel is shown in Fig. 3.

2—The wiring diagram of the 1913 Cole is shown in Fig. 2. It is, however, impractical to change this to a six-volt system and still have the starter work, but can be easily done if the starter is not required. The accompanying sketch shows the method of wiring. The No. 3 terminal is grounded as this is one end of the shunt field and also one side of the armature. The No. 1 terminal is the positive brush connection. The No. 2 terminal is the other end of the shunt winding, while the No. 4 terminal is the positive brush connection after coming through the series field winding.

The sketch on the opposite page, Fig. 1, shows the method that we think will be O. K. but if the charging rate is not high enough, the connections can be changed as suggested on the sketch. If, however, the charging rate should be too high, the connection between No. 2 and No. 4 should be a coil of iron wire instead of a piece of copper wire, as this would reduce the field current.

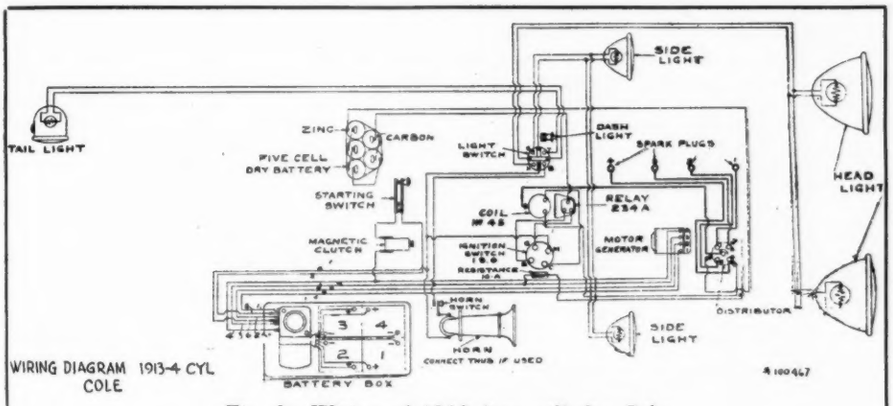


Fig. 2—Wiring of 1913 four cylinder Cole

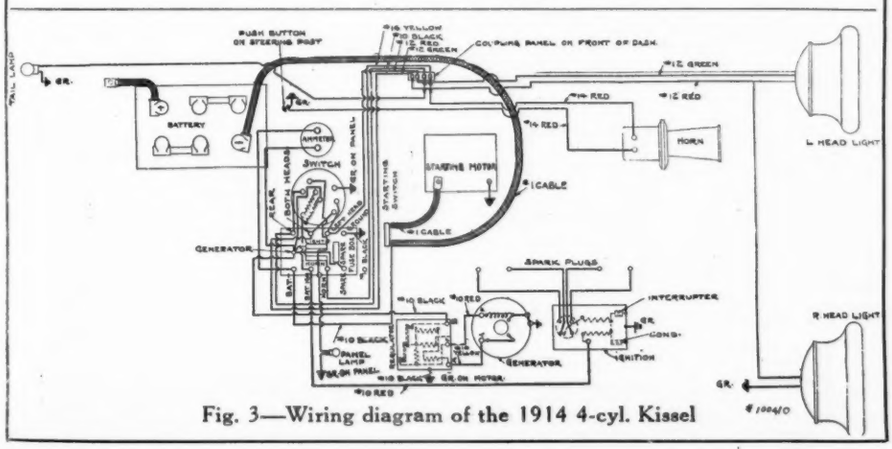


Fig. 3—Wiring diagram of the 1914 4-cyl. Kissel

WHEN TO REGRIND CYLINDERS

Q—Please advise where I may buy Deluxe pistons.

2—Is it just as well to work these pistons in cylinders with a grinding compound instead of having them rebored?—John Kilburg, Lancaster, Wis.

1—Information as to where you can purchase De Luxe pistons is being sent you by letter.

2—If the cylinders are out of round to the extent of .003 or more they should be reground.

PERTAINING TO RECTIFIERS

Q—Kindly give name of firms supplying directions for constructing rectifiers as per your answer to Sam's repair shop inquiry in Provincetown, Mass.—George Kamps, Zeeland, Mich.

This will be answered by special letter.

DATA PERTAINING TO CASE CAR

Q—I have a Case Car; the engine is a T-head, two camshafts, Westinghouse starting motor, located on left front of motor, Westinghouse generator on left rear of motor. Bosch DU4 magneto, multiple disc clutch. The only number I have been able to find is stamped on top of the front cylinder and is 23466. Publish wiring diagram for this car.

2—What is the gear ratio?—Kliney's Garage, Windham, Mont.

1—This car is either a model 25,35 or 40-1914 Case. The models are distinguished by the size of their engines. The model 25 has an engine 3¾ x 4¼, the model 35 has an engine 4¼ x 5¾, the model 40 has an engine 4½ x 6, all are T heads. The data given below is for the model 25. This wiring diagram is shown in Fig. 5. The fuse box is under the cover plate on the cowl board. The order of the fuses starting at the top being as follows: extra, tail, head, side.

2—The gear ratio for the model O is 4.32 to 1, the model R, 5 to 1, and the model S 4.32 to 1.

POOR VAPORIZATION ON OLD MODEL CAR

Q—We have a model 79 Overland. The engine does not work well at high speed. It misses and does not have a good pick-up. We have installed a new carbureter, piston rings, wrist pins, valves, and guides. The ignition is good. Engine heats up quickly and knocks as soon as it gets hot. Do you think this is the fault of the old style manifold? Where can I secure a hot spot for this manifold?

2—What is the correct timing for this engine? — Elmer Hassenflug, Cassandia, Pa.

1—The greater part of the trouble encountered in old cars is due to their inability to carburate the present day fuel. The addition of a hot spot should prove very beneficial for the operation of this car. The names of the firms supplying this equipment will be mailed by special letter.

2—The flywheel of the model 79 being 18 in. in diameter, the following table gives the measurement in inches of the valve operations when laid out on the rim of the flywheel.

Diameter of flywheel	18 in.
Inlet valve opens after upper dead center	1¼ in.
Exhaust valve closes after upper dead center	2 23/64 in.
The valve tappet clearance should be	.012 in.

CONVERTING OVERLAND 75B TO SPEEDSTER

Q—Can an Overland 75B be made fast enough for mile or half mile dirt track with little expense?

2—How much can the valve ports be enlarged? How can this be done and where?

3—Where can we get valves to fit?

4—Would you advise a special camshaft for this engine?

5—What is the correct timing?

6—What ignition would you advise us to use on this engine?

7—Is it advisable to light pistons and connecting rods by drilling and what size holes or would it be better to use a light piston with two rings?

8—About how much can this flywheel be cut down to get best results?

9—Would the present oiling system be alright for high speed or what changes would you advise?

10—Publish the power curve of this engine.

11—Which would give best results, short or long intake pipe?

12—Can a set of Timken roller bearings be used in the rear wheels satisfactorily? — Harry Kaupka, care Main Garage, Crown Point, Ind.

1—The Overland 75B can be converted into a car for dirt track racing but it will entail considerable expense.

2—⅛ to 3/16 in. This can be done by drilling out the ports with a twist drill. This work can be done in any up-to-date garage.

3—We would advise that you communicate with some of the car wrecking companies or the leading valve manufacturers.

4—This is entirely a question of finances. Probably better performance can be secured by a special camshaft, but special camshaft would cost considerable money—not less than $30.

5—The flywheel being 14⅛ in. in diameter, the following table gives the measurement in inches, of the valve operations when laid out on the rim of the flywheel:

Diameter of flywheel	14⅛ in.
Inlet valve opens late	63/64 in.
Inlet valve closes late	4 11/16 in.
Exhaust valve opens early	4 43/64 in.
Exhaust closes late	1 13/16 in.

6—This is entirely a matter for choice, as the battery ignition with which the car originally was equipped, should prove satisfactory if it is carefully gone over previous to putting the car in service.

7—If the connecting rods are lightened we would advise that the holes be no larger than 5/16 in. diameter, regardless of the number or the size or weight of pistons used. Not over 15 pounds should be removed from the flywheel.

8—The present oiling system would be alright if a means of replenishing the oil in the crankcase is available. This can be done by the addition of a hand oil pump connected to an auxiliary oil tank. Or, if you wish to make extensive changes, the main bearings could be oiled by force feed, which would be done by connecting to the oil pump and running an oil distribution pipe to each main bearing.

10—This is not available.

11—Short.

12—Yes. Although it would necessitate a revision of the rear wheel hub and rear axle housing.

BYPASSING COOLING WATER

Q—What effect if any would placing a valve in the cooling system so as to stop the circulation of the water (at will) have on the water pump?

2—With what pressure would a pump such as is used on the 1918 Paige 6-55 force the water against such a valve when running at about 25 m.p.h.?

3—Would changes in speed or the use of a different type water pump change this pressure noticeably? — Automotive Accessories Co., Seattle, Wash.

1—This would have no detrimental effect on the water pump. If the water pump is of the centrifugal type which is the type commonly used, a pressure not to exceed 20 pounds at 25 m.p.h. will be exerted against the valve if it is on the discharge side of the pump.

2—Not to exceed 20 pounds. By the use of two valves one of which should be installed on the intake side of the pump the pressures can be avoided.

3—A water pump of the gear or plunger type would build up quite an excessive pressure if the outlet were obstructed. Another valve which should work simultaneously with the valve you suggest should control the amount of water admitted to the intake of the pump. This control of the water on the inlet side of the pump would prevent the pump from building up an excessive pressure regardless of its speed or type.

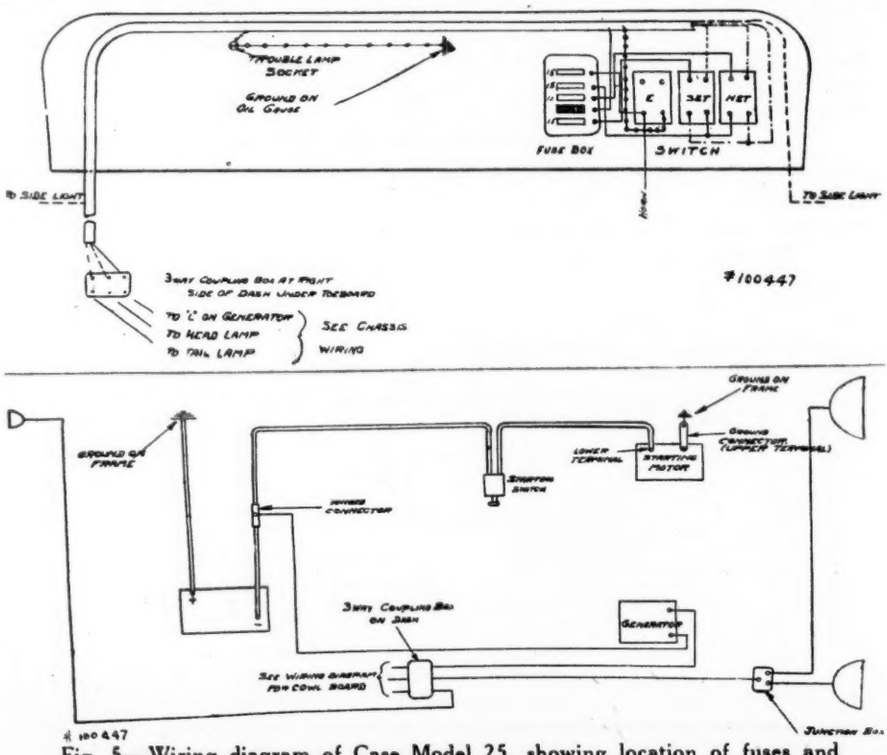


Fig. 5—Wiring diagram of Case Model 25, showing location of fuses and junction box

How to Tell the Age of a Battery

Q—Have you any information in regard to comparative discharge tests for the standard 6-volt batteries? If not, will you supply me with curves of Exide, Willard, Vesta, Prest-O-Lite, Ray and Philadelphia batteries?

2—Where can I obtain a list of the yearly code markings of the different batteries; that is, to tell the age of a battery?—Fred A. Tolman, Brookline 47, Mass.

1—This information is not available at the present time. As soon as this data is secured it will be published.

2—The Exide battery; the date of shipment from the factory since Oct., 1917, has been stamped on the top of the first inter-cell connector link from the negative end of the battery and not on the name plate. Figures are used to indicate the dates. This is presented here in the form of a table with the columns headed as follows:

EXIDE AGE CODE

Month		Stamp	Month		Stamp	Month		Stamp
Oct.	1917	Y	July	1918	G	April	1919	R
Nov.	"	Z	Aug.	"	H	May	"	S
Dec.	"	&	Sept.	"	I	June	"	T
Jan.	1918	A	Oct.	"	J	July	"	U
Feb.	"	B	Nov.	"	K	Aug.	"	V
Mar.	"	C	Dec.	"	L	Sept.	"	W
April	"	D	Jan.	1919	M	Oct.	"	Y
May	"	E	Feb.	"	O	Nov.	"	Z
June	"	F	Mar.	"	Q	Dec.	"	&

U. S. L. AGE CODE

	1917	1918	1919	1920
January	AQ	AR	AE	QF
February	BQ	BR	CA	BK
March	CQ	CR	DC	
April	DQ	DR	FB	
May	EQ	SS	GA	
June	FQ	ST	HB	
July	GQ	W	KD	
August	HQ	UX	WS	
September	IQ	TU	PB	
October	JQ	TW	RC	
November	KQ	WS	WA	
December	LQ	WZ	XC	

VESTA AGE CODE

	1914	1915	1916	1917	1918
January	AZ	AY	AX	AW	AV
February	BZ	BY	BX	BW	BV
March	CZ	CY	CX	CW	CV
April	DZ	DY	DX	DW	DV
May	EZ	EY	EX	EW	EV
June	FZ	FY	FX	FW	FV
July	GZ	GY	GX	GW	GV
August	HZ	HY	HX	HW	HV
September	IZ	IY	IX	IW	IV
October	JZ	JY	JX	JW	JV
November	KZ	KY	KX	KW	KV
December	LZ	LY	LX	LW	LV

The first letter of the code indicates the month of the year numbered alphabetically. The second letter of the code denotes the year of starting at the end of the alphabet and working toward the beginning, Z indicating 1914, 5 1915, and so on.

WILLARD AGE CODE

	1913	1914	1915	1916	1917	1918
January	K	A	M	AA	BA	CA
February	L	B	N	AB	BB	CB
March	M	C	O	AC	BC	CC
April	N	D	Q	AD	BD	CD
May	O	E	R	AE	BE	CE
June	Q	F	S	AF	BF	CF
July	R	G	T	AG	BG	CG
August	S	H	U	AH	BH	CH
September	T	I	V	AJ	BJ	CJ
October	U	J	W	AK	BK	CK
November	V	K	Y	AL	BL	CL
December	W	L	Z	AM	BM	CM

The Willard code uses the first letter as the year since 1916, using A for 1916, and so on, alphabetically. The second letter indicates the month in alphabetical order except that I has been dropped.

PREST-O-LITE BATTERY AGE CODE

The Presto-O-Lite age code indicates the plant at which the battery was made and in what month and also the branch from which it was distributed. When the marking IJ would indicate that the battery was manufactured at Indianapolis plant in December, 1917, the code follows:

Plant 2	50
Plant 3	60
O Plant 3	60
Indianapolis	1
Baltimore	2
Boston	3
Buffalo	4
Chicago	5
Cincinnati	6
Cleveland	7
St. Louis	8
Dallas	9
Denver	10
Detroit	11
Kansas City	12
Los Angeles	13
Jacksonville	14
Milwaukee	15
Minneapolis	16
New York	17
Omaha	18
Philadelphia	19
Pittsburgh	20
Memphis	22
San Francisco	23
Seattle	24
Atlanta	25
Merrilton	27
Indian Orchard	28
Des Moines	29
Davenport	30
Winnipeg	31
Syracuse	32

1917	
June	C
July	P
Aug.	E
Sept	F
Oct	G
Nov	H
Dec.	J

1918	
Jan.	K
Feb.	L
Mar.	M
April	N
May	PN
June	O
July	R
Aug.	S
Sept	T
Oct	U
Nov	V
Dec	W

1919	
Jan	X
Feb.	Y
Mar.	L
April	A
May	B
June	C
July	D
Aug.	E
Sept	F
Oct	G
Nov.	H
Dec	J

Relation of Valve Timing Angle to Flywheel Diameter or Circumference Explained With Handy Table Making Figuring Unnecessary

Q—In the December 22 issue of MOTOR AGE I saw a diagram for timing Hupmobile model N. and you give, exhaust valve closes 5 degs. after top center to be equal 11/16 in. and in same issue on question for timing Mercer you give intake valve opening 5 degs. to be equal 1/16 in. Advise why this difference of length which is not in proportion to the amount of degrees.—John Maghirell, New York, N. Y.

You have read the cut referred to incorrectly. Regarding the closing of the exhaust valve you will note the angle is specified as 5 degrees and above and to the right of it is the designation 11/16, this refers to the equivalent of five degrees measured on the periphery or rim of the flywheel and is 11-16ths of an inch. It might be well to inform you that all such designations on this cut refer to distance measured on the flywheel.

Regarding the measurement of timing by the number of teeth on the camshaft gear, this can be done if the number of teeth on the gear are counted. We shall take your illustration for an example. In this example it is desired to open the inlet valve 15 degrees after top center. Now for the sake of convenience let us assume that the camshaft gear has 24 teeth. This means that the total distance around the circumference of the gear is divided into 24 equal parts, each part being a tooth of the gear.

The total distance around the gear is also equal to 360 degrees. It follows then that if the gear is divided into 24 teeth, that each tooth will cause a movement of the gear equal to the relation of 24 to 360 which is 15 degrees. Then if the engine is brought to the top center position and the gears marked while in this position and then rotated until the next tooth on the camshaft gear is in mesh the crankshaft will have revolved exactly 30 degs. Because the crankshaft revolves at twice camshaft speed. One half a tooth would mean 15 degrees travel of the crankshaft and piston or 7½ degrees of travel of the camshaft.

This same procedure can be followed regardless of the number of teeth in the camshaft gear. Where the amount of movement of the camshaft owing to an odd number of teeth causes a movement of the crankshaft which is not a multiple in degrees of the valve timing in degrees the results will be only approximate because of the inability to have a small tooth and a large tooth on the same gear.

On some aviation engines where there is no flywheel the camshaft gear hub is equipped with two or more keyways which will permit splitting a tooth as it were to secure the proper camshaft position. This same method of adjustment is possible where the camshaft gear is bolted to a flange on the camshaft by means of a number of bolts.

There is no practical way to reduce degrees to inches of piston travel unless the connecting rod length is known. It is possible to convert degrees of valve timing to inches of travel on the flywheel if the diameter or circumference of the flywheel are known. The same procedure as was followed on the camshaft gear is used in this method.

Suppose for instance we find that the exhaust valve just closes when the piston is 10 degs. past the upper center position. Let us assume that the diameter of the flywheel is 12 in., which means that its circumference is 3 1/7 times this distance or 37.699 in. We have only to secure the fractional relation of the degrees specified to the complete circle. In this case 360 deg. divided by 10 deg. equals 1/36. If 37,699 in. equal the circumference of the flywheel it will by the same token equal a complete circle or 360 deg. Then if 10 deg. equal 1-36 of the circle it will also equal 1-36 of the circumference.

37,699 = circumference = 360 deg.

360 deg. ÷ 10 = 1-36.

37,669 ÷ 1-36 = 1.05 in., or 10 deg.

at left is shown a conversion table for converting degrees to inches of travel of the flywheel.

Using the same example we will assume that the flywheel is 22 in. in diameter or 69 in. in circumference. These dimensions are found in the left hand columns of the table. Then go to column under 10 degs. and the distance on the flywheel equivalent to 10 degs. is given either in inches or fractions thereof.

As a ready reference book for the practical man we would recommend books of the type Dykes Automobile & Gas Engine Encyclopedia and the Automobile Repair Man's Helper and Electrical Equipment of the Motor Car, all these books can be secured from the U. P. C. Book Company.

Conversion Table Showing Relation of Degrees to Size of Flywheel

Diam. WHEEL	Circum.	1°	2°	3°	4°	5°	6°	7°	8°	9°	10°	20°	30°	40°	50°
12	37.699	.10	.21	.31	.42	.52	.63	73	84	94	1 05	2 09	3 14	4 19	5 24
1/4	38.485	.11	.21	.32	.43	.53	.64	75	86	96	1 07	2 14	3 20	4 27	5 34
1/2	39.270	.11	.22	.33	.44	.55	66	77	87	98	1 09	2 18	3 27	4 36	5 46
3/4	40.055	.11	.22	.33	45	.56	.67	78	89	1.00	1 11	2.22	3 33	4 45	5 56
13	40.841	.11	.23	.34	.45	.57	.68	79	91	1.02	1 13	2.26	3 40	4.54	5 67
1/4	41.626	.12	.23	.35	.46	.58	.69	81	93	1.04	1.16	2.31	3.47	4.63	5.78
1/2	42.412	.12	.24	.35	.47	.59	.71	82	94	1.06	1.18	2.35	3.53	4 71	5.89
3/4	43.197	.12	.24	.36	.48	.60	.72	84	96	1 08	1 20	2 40	3 60	4 80	6.00
14	43.982	.12	.24	.37	.49	.61	73	86	.98	1.10	1.22	2.44	3.66	4.89	6.10
1/4	44.768	12	.25	.37	.50	.62	.75	87	99	1 12	1.24	2.48	3.73	4.98	6.21
1/2	45.553	.13	.25	.38	.51	.63	.76	89	1.01	1 14	1.27	2 53	3.80	5.07	6.34
3/4	46.338	13	.26	39	.51	.64	.77	90	1 03	1.16	1.29	2.57	3.86	5 15	6.44
15	47.124	.13	.26	.39	.52	.65	79	.92	1.05	1.18	1.31	2 62	3.93	5 25	6.55
1/4	47.909	.13	.27	.40	.53	66	.80	93	1.06	1.20	1.33	2.66	3.99	5 31	6.65
1/2	48.695	.14	.27	.41	.54	.68	.81	95	1.08	1.22	1 35	2.70	4.05	5 40	6.76
3/4	49.480	.14	.27	.41	.55	.69	.82	96	1 10	1.24	1.37	2.75	4.12	5.49	6.87
16	50.265	.14	.28	.42	.56	70	84	98	1 11	1.26	1.40	2.79	4.19	5.59	6 98
1/4	51.051	.14	.28	.43	.57	71	85	99	1.13	1.28	1.42	2.84	4.25	5.68	7.10
1/2	51.836	.14	.29	.43	.58	.72	86	1 01	1.15	1.29	1.44	2.88	4.31	5.76	7.20
3/4	52.622	.15	.29	.44	.59	73	88	1 02	1 17	1.31	1.46	2.92	4.38	5.85	7.30
17	53.407	.15	.30	.44	.59	.74	.89	1.04	1.18	1.33	1.48	2.96	4.44	5.33	7 40
1/4	54.192	.15	.30	.45	.60	.75	.90	1.05	1.20	1.35	1.50	3.00	4.51	6.02	7.53
1/2	54.978	.15	.31	.46	.61	.76	.92	1.07	1.22	1.37	1.53	3.05	4.58	6.11	7.65
3/4	55.763	15	.31	.46	.62	.77	.93	1.08	1.24	1.39	1.55	3.10	4.65	6.20	7.75
18	56.549	.16	.31	.47	.63	.79	94	1.10	1.25	1.41	1.57	3.14	4.71	6.29	7.85
1/4	57.334	.16	.32	.48	.64	.80	.95	1.11	1.27	1.43	1.59	3.18	4.77	6.37	7.95
1/2	58.119	.16	.32	.48	.65	.81	.97	1.13	1.29	1.45	1.61	3.23	4.84	6.45	8.07
3/4	58.905	16	.33	.49	.65	.82	.98	1.14	1.31	1.47	1.63	3 26	4.90	6.54	8.18
19	59.690	.17	.33	.50	.66	.83	.99	1.16	1.32	1.49	1.66	3.32	4.97	6.63	8.30
1/4	60.476	.17	.34	.50	.67	.84	1.01	1.17	1.34	1.51	1.68	3.36	5.04	6.71	8.40
1/2	61.261	.17	.34	.51	.68	.85	1.02	1.19	1.36	1.53	1.70	3.40	5.10	6.80	8.51
3/4	62.046	.17	.34	.52	.69	.86	1.03	1.21	1.38	1.55	1.72	3.45	5 17	6.90	8.62
20	62.832	.17	.35	.52	.70	.88	1.05	1.22	1.39	1.57	1.74	3.48	5.24	6.98	8.73
1/4	63.617	.18	.35	.53	.71	.89	1.06	1.24	1.41	1.59	1.77	3.54	5.31	7.07	8.85
1/2	64.403	.18	.36	.54	.72	.90	1.07	1.25	1.43	1.61	1.79	3.56	5.37	7.15	8.95
3/4	65.188	.18	36	.54	.72	.91	1.09	1.27	1.45	1.63	1.81	3.62	5.44	7.25	9.05
21	65.973	.18	.37	.55	.73	.92	1.10	1.28	1.47	1.65	1.83	3.66	5 50	7.33	9.15
1/4	66.759	.19	.37	.56	.74	.93	1.11	1.30	1.48	1.67	1.86	3.70	5.56	7.41	9.26
1/2	67.544	.19	.38	.56	.75	.94	1.12	1.31	1.50	1.69	1.88	3.75	5.63	7.50	9.38
3/4	68.330	.19	.38	.57	.76	.95	1.14	1.33	1.52	1.71	1.90	3.79	5.69	7.59	9.49
22	69.115	.19	.38	.58	.77	.96	1.15	1.34	1.53	1.73	1.92	3.84	5 75	7.68	9.60
1/4	69.900	.19	.39	.58	.78	.97	1.16	1.36	1.55	1.75	1.94	3.88	5.82	7.76	9.70
1/2	70.686	.20	.39	.59	.79	.98	1.18	1.37	1.57	1.77	1.96	3.93	5.88	7.85	9.82
3/4	71.471	.20	40	.60	.79	.99	1.19	1.39	1.59	1.79	1.98	3.96	5.95	7.94	9.92
23	72.257	.20	.40	.60	.80	1.00	1.20	1.40	1.61	1.81	2.01	4.02	6.02	8.03	10.03
1/4	73.042	.20	.41	.61	.81	1.01	1.22	1.42	1.62	1.82	2.03	4.06	6.09	8.13	10.13
1/2	73.827	.20	.41	.61	.82	1.02	1.23	1.43	1.64	1.84	2.05	4.10	6.15	8.21	10.23
3/4	74.613	.21	.41	.62	.83	1.04	1.24	1.45	1.66	1.86	2.07	4.15	6.22	8.30	10.35
24	75.398	.21	.42	.63	.84	1.05	1.26	1.46	1.67	1.88	2.09	4 19	6.28	8.38	10 45

Conversion Table, Hundredths of an Inch to Sixty-Fourths

.01, .02..	1/64	.14.....	9/64	.26, .27..	17/64	.39.....	25/64	.51, .52..	33/64	.64.....	41/64	.76, .77..	49/64	.89.....	57/64
.03.....	1/32	.15, .16..	5/32	.28.....	9/32	.40, .41	13/32	.53.....	17/32	.65, .66..	21/32	.78.....	25/32	.90, .91..	29/32
.04, .05..	3/64	.17.....	11/64	.29, .30..	19/64	.42.....	27/64	.54, .55..	35/64	.67.....	43/64	.79, .80..	51/64	.92.....	59/64
.06, .07..	1/16	.18, .19..	3/16	.31, .32..	5/16	.43, .44..	7/16	.56, .57..	9/16	.68, .69..	11/16	.81, .82..	13/16	.93, .94..	15/16
.08.....	5/64	.20, .21..	13/64	.33.....	21/64	.45, .46..	29/64	.58.....	37/64	.70, .71..	45/64	.83.....	53/64	.95, .96..	61/64
.09, .10..	3/32	.22.....	7/32	.34, .35..	11/32	.47.....	15/32	.59, .60..	19/32	.72.....	23/32	.84, .85..	27/32	.97.....	31/32
.11.....	7/64	.23, .24..	15/64	.36.....	23/64	.48, .49..	31/64	.61.....	39/64	.73, .74..	47/64	.86.....	55/64	.98, .99.	63/64
.12, .13..	1/8	.25.....	1/4	.37, .38..	3/8	.50.....	1/2	.62, .63..	5/8	.75.	3/4	.87, .88..	7/8	1.00.....	1

SILENT TIMING GEARS FOR ENGINES

Q—We would like to know the proper distance between the camshaft and crankshaft on the Overland 4 engine.

2—Where can we obtain silent timing gears for same engine?—L. J. Peterson, care Automotive Co., Isabel, S. Dak.

1—We presume you refer to the distance between the crankshaft and camshaft gears. Regarding these gears they should not have a backlash of more than .004.

2—Names of firms supplying this type of gear is being mailed to you.

R100446

SERVICE EQUIPMENT

Aids for Time Saving & Accuracy

BOWSER VISIBLE GASOLINE PUMP

Of five gallon capacity, this pump is based on the principle of piston type measurement and incorporates the Bowser water separating filter which extracts all moisture from the gasoline discharged. It also has several new features for the protection of the public in that a bell announces the completion of each gallon measurement of the piston stroke. Thus the customer can check the measurement without watching the pump. S. F. Bowser and Co., Ft. Wayne, Ind.

HUSKEE PORTABLE ELECTRIC DRILL

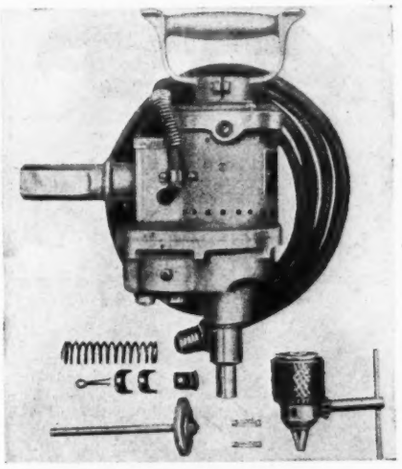
A new electric driven tool, which in reality comprises three tools, has been put on the market by the Rivett Lathe and Grinder Co., Boston, Mass. The following three tools are incorporated in it.

A portable electric drill with ⅜-in. capacity in steel and ⅝-in. capacity in soft metals.

An electrically driven valve grinder with a capacity for grinding all types and sizes of poppet valves from those used in motorcycles to those in the largest trucks.

A portable or stationary grinder for light work.

This portable drill has a spade handle of ample size to accommodate a large hand and of such design as to enable the operator to use the tool as a breast or shoulder drill as well as a hand drill, a side handle which is flattened and internally re-enforced, so that the tool may be clamped in a vise on this handle and thereby held rigidly as a stationary tool for certain drilling operations, and for using the grinding wheel, provided for sharpening drills and doing other light work.



Huskee portable electric drill

WEAVER BUCKET PUMP

Weaver Valveless Bucket Pump has a unique feature inasmuch as it will not only discharge lubricant into the desired chamber, but will also remove old grease and particles and place them into a separate compartment of the bucket without disturbing the good lubricant. It is equipped with metal hose and lever pump handle, which is adjustable to operation at either a standing or stooped position. Weaver Mfg. Co., Springfield, Ill.

Weaver bucket pump

AKRON RUBBERMOLD TYPE E RETREADER

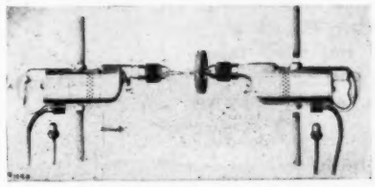
"Akron Rubbermold" Improved Type E Cavity Retreader, shown in the accompanying illustration, is a retreading outfit which will accommodate all makes of tires from three inch to five inch cord and five and one-half inch fabric. It is fitted with a self-contained steam boiler, and may be operated with either gas or gasoline. Akron Rubber Mold & Machine Co., 919 Sweitzer Ave., Akron, O.

WODACK COMBINATION PORTABLE DRILL AND GRINDER

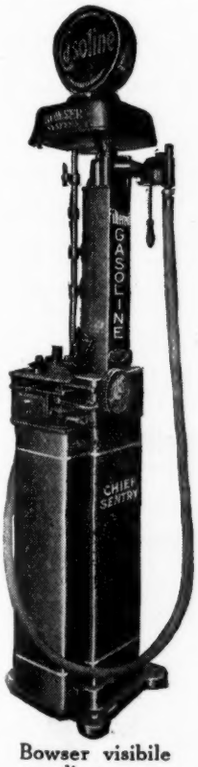
This combination tool can be used for drilling holes in metal or wood and when used with grinding wheel attachment will cover the average requirements for grinding. It has a drilling capacity of ⅛ to ⅝ in. in steel and when used as a grinder, carries a 6x¾-in. grinding wheel. Two separate speeds are provided, the slow speed for drilling and the high speed for grinding. The motor develops ½ h.p. when under load. Wodack Electric Tool Corp., Chicago.

INTERNATIONAL RADIATOR ASSEMBLING OUTFIT

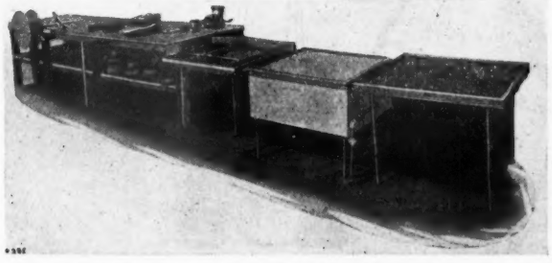
This equipment is designed to make radiator cores for replacement purposes. It consists of the following devices: Adjustable core material roller, tube cut-off machine, tube folding mandrel, tube seaming mandrel, surface plate table, fluxing table, soldering kettle and furnace and core soldering frame. Price, complete, $395. International Radiator Co., Ottumwa, Ia.



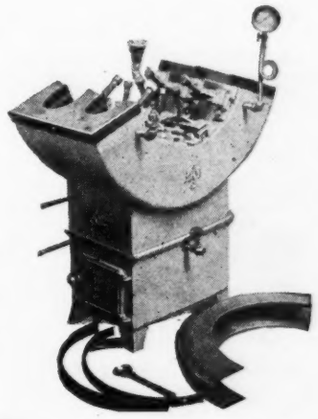
Wodack combination portable drill and grinder



Bowser visibile gasoline pump



International radiator assembling outfit



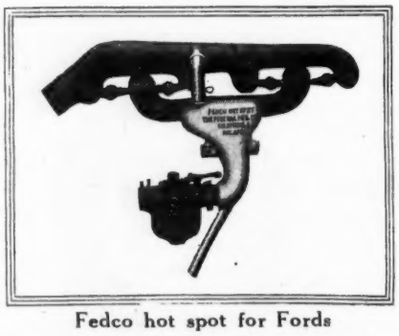
Akron rubbermold type E retreader

The ACCESSORY SHOW CASE

New Sources of Retail Profit

FEDCO HOTSPOT FOR FORDS

The "Fedco" Hotspot for Ford cars has recently been put on the market. This device completely encloses the intake manifold and makes use of the exhaust gas to super-heat the incoming mixture. The manufacturers claim that by the installation of their hotspot a saving of gasoline is effected. A more completely vaporized mixture is supplied to the engine which reduces the deposit of carbon to a minimum and prevents dilution of the crankcase oil.—The Federal Mfg. Co., 162-172 W. Long St., Columbus, Ohio.



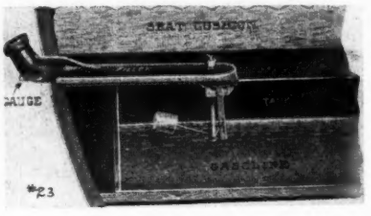
Fedco hot spot for Fords

KIL-NOCK AUTOMATIC BEARING ADJUSTER

This is intended to replace the conventional type of ⅝ in. bearing bolt. A coiled spring exerting constant helical pressure keeps the nut screwed up tight and as wear in the bearings occurs the play is automatically taken up. It is claimed they can be installed in about two hours. Ramsey Accessory Mfg. Co., 1515 No. Broadway, St. Louis.

FORBES FILLER AND GAGE

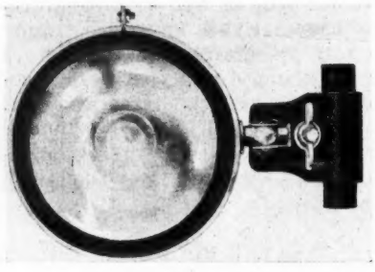
A combination filler and gasoline gage for Ford and Chevrolet cars. With this filler it is unnecessary to lift the seat cushion to replenish the gasoline supply. The gage is mounted directly below the filler cap. It can be installed in ten minutes and is constructed as a malleable casting. Forbes Filler and Gage Co., 1313 Engineers Bldg., Cleveland.



Forbes filler and gage

TWIN GEAR JACK

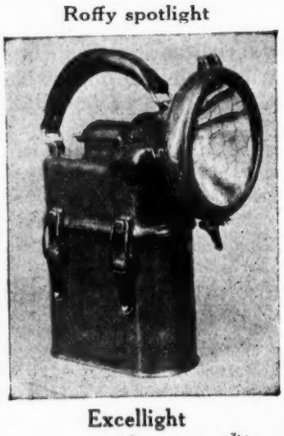
Twin Gear Jack has a capacity of one and one-half tons and is described by the cut. Price $4. Republic Auto Parts Co., Long Island City, N. Y.



Roffy spotlight

EXCELLIGHT

The Excellight is manufactured by the National Marine Lamp Co. of Forestville, Conn. It has aluminum case, silvered mirror reflector, wired fireglass front, leather handle, two extra bulbs in top and uses two No. 6 dry batteries, practically waterproof—focusing range for flood light or 700 foot spot light. List price, $13.



Excellight

GILBERT HORN SIGNAL ATTACHMENT

Gilbert Horn Signal Attachment can be used on any Ford car where the push button is attached to the steering post. Installation is affected by slipping the clamp over the button and drawing same up with screw provided. Price, $1. A. Gilbert & Sons Brass Foundry, St. Louis, Mo.

ROFFY SPOTLIGHT

The feature of this spotlight is the glass reflector, designed on somewhat the same principle as the powerful lights used on the sea craft of the navy. Power without glare is the claim of the manufacturers. The bracket used on the light is specially intended for it and secures the lamp snugly. Price $5. Standard Corp., Columbus, O.

MUSHROOM TRAFFIC LIGHT

Electrical & Specialty Supply Co., Chicago, Ill., has in operation in various parts of the city, what is known as the "Mushroom Traffic Light," pictured here. It is made of strong steel and is set in the street in place of the safety island. The current for operation, is, of course, supplied by underground power lines.

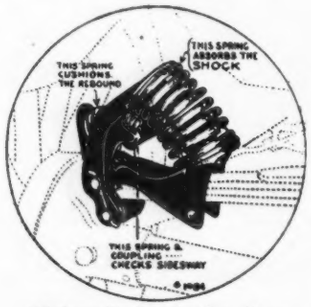
FIT 'EM RITE BEARING COMPOUND

Eastern Products Co., 17 Federal St., Worcester, Mass., has placed on the market a bearing compound for which the claim is made that it will not scratch or harm a bearing in any way. It is recommended by the manufacturers for soft metal bearings. Price, per box (containing coarse and fine compound in individual cans), $3.

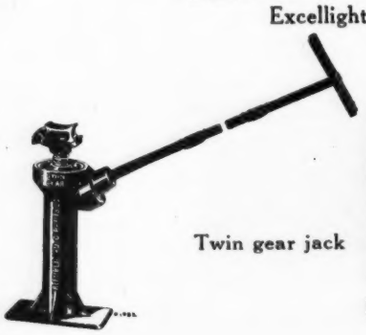
MAINWELL SHOCK ABSORBERS

The cut illustrates the rear spring absorber and tells of the advantages. Price, $17.50 per set of four. The absorber is set on the spring, as shown, in a position which takes the shock from the spring before it reaches the body.—Mainwell Mfg. Co., Indianapolis, Ind.

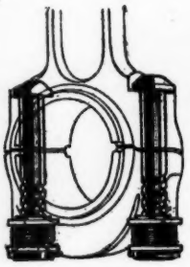
Mushroom traffic light



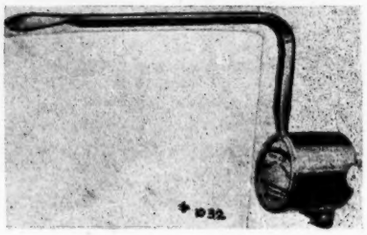
Mainwell shock absorbers



Twin gear jack



Kil-nock automatic bearing adjusters



Gilbert horn signal attachment

VACU-SIGNAL

This is an automatic "stop" signal which by attachment to the brakes, reflects the word "stop" to the cars behind as soon as the brakes are applied. Another feature of this signal is that by connection with the steering post, on which the control button is placed, "right" and "left" turns are also indicated. Automobile Appliance Co., 804 Finance Bldg., Philadelphia.

TWO-IN-ONE RIM TOOL

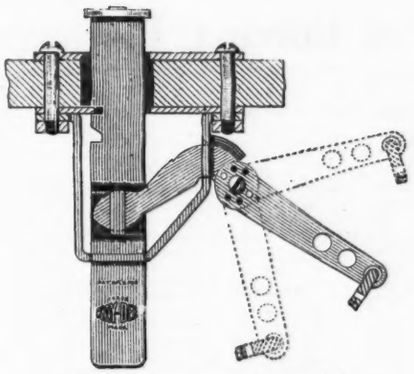
Two-in-One rim tool combines the jack and tire remover. It is especially useful where room for tools is small. The cut illustrates how it fastens to the tire and rim for removal and also shows how the Two-in-One is used for a jack. Price, $10 complete. Conolly-Hardy & Co., Athens, Ga.

STEWART SPRING HOOD CLAMP FOR FORDS

Stewart Spring Hood Clamp for Ford cars is made by the Stewart Manufacturing Co., Inc., Oakland, Cal. Its adjustable spring tension gives ready fit on Fords and holds the hood snugly and trimly in place, silencing the chatter and rattling frequently noticed. It is made in both black enamel finish and nickel.

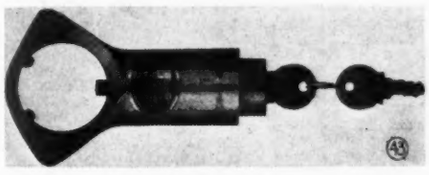
WILCOX SAFETY SIGNAL

Wilcox Pressed Steel Co., Chicago, has brought out two stop signals, one for the front of the car, the other for the rear. Both combine the license plate holder and the rear light also acts as a tail lamp. The top cut shows the rear signal, the lower the front warning. Rear signal, $12.50. Front signal, $7.50.



K-D valve operating pedal

Hercules rim tool



The Bulldog device locks the steering gear with a steel plunger which extends through the steering. Column. Price $15. Forshay Bros., 234 West 55th St., New York City

HERCULES RIM TOOL

Hercules Rim Tool is an attachment which is designed to make removing of tires easier. Once attached to the rim, it will loosen all split rims and thereby makes removal or application of tires quite simple. Price, $5.50. Haddon Auto Supply Co., Haddon Heights, N. J.

BUTTERS LOCK

This lock is designed to give protection to spare tires. The cut shows how this lock is used either on the rear or side carrier. Price $3.75 (by doz.). Butters Lock Co., Atlanta, Ga.

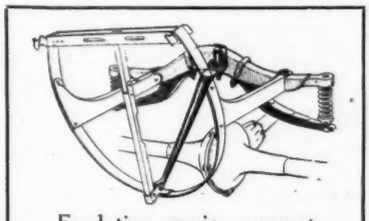
K-D VALVE OPERATING PEDAL

This pedal has a few features in that the plunger rod is connected both with the upper and lower part of the floor board. The cut shows better the functioning of this tool. K-D Mfg. Co., Lancaster, Pa.

R-M STEEL FELLOE

The Mott Wheel Works, of Jackson, Mich., has put on the market the R-M steel felloe. This is a channel shape, the rear flange acting as a stop and supporting the rim circumferentially. The front flange also supports the rim and has clearances to allow standardized rims without special beads to automatically drop into the correct working position. The flanges are designed to hold the rim true to assure perfect alignment of rim and tire on the wheel. One of the main features of the wheel is that only three clamps are required to hold the rim in place, as compared with the six usually employed.

Vacu-signal



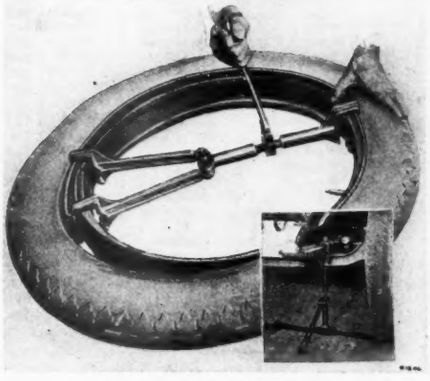
Ford tire carrier support

FORD TIRE CARRIER SUPPORT

The Ford Tire Carrier Support is made from magna metal, weighing six ozs. Price, $1.50. Ford Necessities Co., 7 E. 42nd street, New York City.

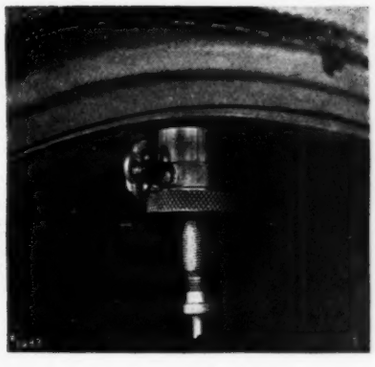
Stewart hood clamp

R-M steel felloe



Two-in-one rim tool

Wilcox safety signal



Butters lock

Specifications of Current Passenger Car Models

NAME AND MODEL	Engine Make	Cylinders, Bore and Stroke	WB	Tires	2-Pass.	5-Pass.	7-Pass.	Coupe	Sedan
Ambassador R	Cont.	6-3⅝x5¼	136	33x5	....	‡4500	$4500	....	$6500
American C	H-S.	6-3¼x5	127	32x4	$2195	2195	‡2250	....	3150
Anderson Series 40	Cont.	6-3¼x4½	120	33x4	2195	1650	1795	$2150	2550
Apperson 8-21-S	Own.	8-3¼x5	130	34x4½	....	2620	2645	3625	3695
Auburn Beauty-Six 6-51	Cont.	6-3¼x4½	121	32x4	1575	1575	1615	2275	2395
Auburn Beauty Six	Cont.	6-3¼x4½	121	32x4½	....	‡2195	....	....	....
Beggs 20T	Cont.	6-3¼x4½	120	33x4	1775	1520	....	2320	2420
Bell 4-32	H-S.	4-3½x5	114	31x4	1195	1195	....	....	....
Bell 6-50	H-S.	6-3¼x5	124	32x4	1545	1545	....	....	....
Biddle B1 & B5	Buda.	4-3¾x5⅛	121	32x4	2950	‡2950	....	3950	3950
Brewster 91	Own.	4-4 x5½	125	32x4½	‡6000	6000	....	....	9200
Buick 1922-34-35-36-37	Own.	4-3⅜x4¾	109	31x4	895	935	....	1295	1395
Buick 1922-44-5-6-7	Own.	6-3⅜x4½	118	33x4§	1365	1395	....	1885	2165
Buick 1922-48-8-50	Own.	6-3⅜x4½	124	34x4½	1785	....	1585	2075	2375
Cadillac 61	Own.	8-3 1/16x5⅛	132	33x5	3100	3150	3150	3925	4100
Case X	Cont.	6-3¼x4½	122	32x4½	....	1890	....	....	2790
Case V	Cont.	6-3½x5¼	126	34x4½	....	....	1935	2585	2990
Chalmers 1922	Own.	6-3¼x4½	117	32x4	1245	1295	1395	1995	2295
Chalmers 1922	Own.	6-3¼x4½	122	32x4	....	....	1395	....	....
Champion Tourist	Lyc.	4-3½x5	113	32x3½	....	995	‡995	....	....
Champion Special	H-S.	4-3½x5	118	32x4	†1095	1095	....	....	....
Chandler Six	Own.	6-3½x5	123	33x4	1595	1595	1695	2295	2395
Chevrolet 490	Own.	4-3¼x4	102	30x3½	525	525	....	875	875
Chevrolet FB	Own.	4-3¼x5¼	110	32x4	975	975	....	1575	1575
Cleveland 41	Own.	6-3 x4½	112	32x4	1175	1195	....	1550	1595
Climber Four K	H-S.	4-3½x5	115	33x4	1385	1385	....	....	....
Climber Six S	H-S.	6-3¼x5	125½	32x4½	2250	2250	....	3000	3100
Cole 890	Nort.	8-3½x4½	127¼	33x5	2485	‡2485	2485	3185	3685
Columbia Challenger	Rut.	6-3½x5	115	32x4	....	1195	....	†1995	1995
Columbia D-C&CS	Cont.	6-3¼x4½	115	32x4	1475	1475	‡1475	‡2295	2350
Comet C-53	Cont.	6-3½x5¼	125	33x4½	....	1985	2085	....	2985
Crawford 22-6-60	Cont.	6-3½x5½	122½	32x4	3000	3000	3000	....	4500
Daniels D-19	Own.	8-3½x5¼	132	34x4¼	‡5350	‡5350	5350	6250	6950
Davis 71	Cont.	6-3⅝x4¼	114	....	....	1195	....	....	....
Davis 61-67	Cont.	6-3¼x4½	120	33x4	1595	1595	‡1695	2095	2195
Dixie Flyer H-S-70	H-S.	4-3½x5	112	32x4	1195	1195	‡1395	1895	1895
Dodge Brothers	Own.	4-3⅞x4½	114	32x4	850	880	....	1280	1440
Dorris 6-80	Own.	6-4 x5	132	33x5	....	‡4785	4785	5800	7190
Dort 19-14	D-Ly.	4-3½x5	108	31x4	865	865	....	1315	1445
Driggs	Own.	4-2⅝x4½	104	30x3½	1275	1275	....	....	1975
Duesenberg Straight 8	Own.	8-2⅞x5	134	33x5	6500	6500	6750	7800	7800
Du Pont A	Own.	4-3⅛x5⅛	124	32x4½	3000	3200	....	3800	4000
Durant A-22	Own.	4-3⅞x4¼	109	31x4	....	890	....	1365	1365
Durant B-22	Anst.	6-3¼x4½	123	32x4½	1600	1650	....	2250	2400
Earl 40	Own.	4-3⅛x5¼	112	32x4	1485	1185	....	....	1895
Elcar K-4	Lyc.	4-3½x5	118	33x4	1095	1095	‡1095	1345	....
Elcar 7-R	Cont.	6-3¼x4½	118	33x4	1395	1395	‡1395	2065	2165
Elgin K-1	Falls.	6-3½x4¼	118	33x4	1345	1295	‡1345	2195	2195
Essex	Own.	4-3⅝x5	108½	32x4	1095	1095	....	1345	1895
Falcon, H.P.M. 12-D22	Own.	4-2¾x4	100	27x3½	2800	†3000	....	....	4000
Ferris Series 60	Cont.	6-3½x5¼	130	32x4½	2575	....	2475	....	3475
Ferris Series 70	Cont.	6-3⅝x5¼	130	32x4½	2895	....	2795	....	3895
Ford T	Own.	4-3⅜x4	100	30x3½	**319	††348	....	580	645
Franklin 9-B	Own	6-3¼x4	115	32x4	2400	2450	....	3200	3450
Gardner T-R & G	Lyc.	4-3½x5	112	32x3½	895	895	....	....	1595
Goodspeed	Own.	4-3⅜x5½	124	32x4½	....	5400	....	....	....
Grant	Own.	6-3½x4½	116	32x4	1385	1385	....	1895	1945
H.C.S.	Weid.	4-3⅝x5½	120	32x4½	2725	‡2775	....	3450	3650
Halladay 4	Own.	4-3½x5	115	32x4	1095	1095	....	1990	2085
Halladay 6	Own.	6-3½x5	115	32x4	1595	1595	....	2295	2395
Handley-Knight	Kn'ht.	4-4½x4½	125	32x4½	....	....	2650	3450	3450
Hanson Six 60	Cont.	6-3¼x4½	121	32x4	1595	1595	1795	‡2475	2585
Hatfield A-42	H-S.	4-3½x5	115	32x4	††1315	1345	....	1950	1950
Haynes 75	Own.	6-3½x5	132	34x4½	2595	‡2395	2395	....	3395
Haynes 55	Own.	6-3½x5	121	33x4	1645	1595	....	2295	2595
Haynes 48	Own.	12-2¾x5	132	34x4½	2895	3596	2895	....	3895
Holmes Series 4	Own.	6-3½x4¼	126	34x4½	‡2950	....	2950	3850	4150
Hudson Super 6	Own.	6-3½x5	126	34x4½	††1695	1795	1745	2570	2650
Huffman R	Cont.	6-3¼x4½	120	32x4	1845	1795	....	....	2795
Hupmobile Series R	Own.	4-3¼x5½	112	32x4	1250	1250	....	1835	1935
Jackson 638	H-S.	6-3¼x5	121	32x4½	‡1685	1485	....	2985	2985
Jordan MX	Own.	6-3⅜x4¾	120	32x4	2095	2095	....	3200	3200
Jordan F	Cont.	6-3½x5¼	127	32x4½	....	....	2475	....	3500
Kenworthy 8-90	Own.	8-3 x5¼	130	32x4½	5000	5000	5250	6000	6000
Kessler K	Own.	4-3⅜x3¾	120	32x4	....	1995	....	....	2445
King K-1922	Own.	8-3 x5	124	32x4½	2140	‡2125	*2125	3125	3235
Kissel 45	Own.	6-3⅜x5½	121	32x4½	2675	2675	2175	3275	3475
Kline Kar 6-55-K	Cont.	6-3¼x4½	117	33x4	1890	1790	1790	2850	2890
LaFayette	Own.	8-3¼x5¼	132	33x5	3985	‡4090	4090	5000	5175
Leach 999	Own.	6-3¼x5¼	134	32x4½	6500	6500	6500	6500	6500
Lexington Series S	Anst.	6-3¼x4½	122	32x4	....	1985	....	....	2285
Lexington Series T	Anst.	6-3¼x4½	128	32x4½	....	....	2785	....	3750
Liberty 10-D	Own.	6-3½x5	117	33x4½	1295	1295	††1345	2085	2245
Lincoln	Own.	8-3⅜x5	136	33x5	†3800	3300	3300	3900	4200
Locomobile 48	Own.	6-4½x5½	142	35x5	....	†7600	7600	‖10500	‖11000
Maibohm B	Falls.	6-3⅛x4½	116	32x4	1395	1395	††1495	2165	2165
Marmon 34	Own.	6-3¾x5⅛	136	32x4½	††3700	3900	3700	4700	5150
Maxwell	Own.	4-3⅝x4½	109	31x4	$ 885	$ 885	....	$1385	$1485
McFarlan 1921	Own.	6-4½x6	140	33x5	6300	†6300	$6300	7500	7500
Mercer Series 5	Own.	4-3⅝x6¾	132	32x4½	3950	‡3950	*3950	4850	5250
Merit	Cont.	6-3¼x4½	119	32x4	††985	1985	....	....	....
Meteor R & RR	Dues.	4-4½x6	129	32x4½	5500	5500	....	....	....
Mitchell F-50	Own.	6-3½x5	120	33x4	‡1490	1490	††790	2290	2440
Mitchell F-50	Own.	6-3½x5	127	33x4	....	....	1795	....	....
Monroe 1922-S-13	Own.	4-3¼x4½	115	32x3½	1295	1295	....	....	....
Monroe 1922-S-14	Own.	4-3¼x4½	115	33x4	....	....	....	2075	2175
Moon 6-48	Cont.	6-3¼x4½	122	32x4	1785	1785	2285	2785	2785
Moon 6-68	Cont.	6-3½x5¼	125	32x4½	....	....	2285	....	....
Murray-Mac Six	Own.	6-3½x5¼	128	34x4½	4250	4250	4250	....	....
Nash 681-7	Own.	6-3½x5	121	33x4	1360	1390	††1540	....	....
Nash 682	Own.	6-3¼x5	127	34x4½	....	....	1540	2090	2390
Nash Four 41-4	Own.	4-3⅝x5	112	33x4	965	985	....	1485	1645
National BB	Own.	6-3½x5¼	130	32x4½	2750	††2750	2750	3890	3990
Noma 3C	Bea.	6-3¼x4½	128	32x4½	2000	‡2100	*2200	....	3200
Noma 1D	Cont.	6-3½x5¼	128	32x4½	3000	††3100	*3200	....	5500
Norwalk 430-KS	Lyc.	4-3½x5	116	32x3½	....	1035	....	....	....
Oakland 6-44	Own.	6-2 11/16x4¾	115	32x4	1120	1145	††1265	1685	1785
Ogren 6 T De Luxe	Cont.	6-3⅝x5¼	134	32x5	‡4250	4250	4350	5200	5500
Oldsmobile 43-A	Own.	4-3¼x5¼	115	32x4	‡1145	1145	....	1645	1795
Oldsmobile 46	Own.	8-2⅞x4¾	122	33x4½	....	††1735	1735	....	2635
Oldsmobile 47	Own.	8-2⅞x4½	115	32x4	1595	‡1595	....	2145	2295
Overland 4	Own.	4-3⅜x4	100	30x3½	595	595	....	850	895
Packard Single-Six	Own.	6-3⅜x4½	116	33x4½	2350	2350	....	3125	3350
Packard Twin Six	Own.	12-3 x5	136	35x5	3850	3850	3850	5240	5400
Paige 6-44	Own.	6-3¼x5	119	32x4	1465	1465	....	1995	2245
Paige 6-66	Cont.	6-3⅜x5	131	33x4½	‡2245	‡2495	2195	3100	3155
Paterson 22-6-52	Cont.	6-3¼x4½	120	32x4½	....	1550	1585	2595	2595
Peerless 56-S-7	Own.	8-3⅜x5	125	34x4½	....	‡2790	2790	3500	3790
Piedmont 4-30	Lyc.	4-3½x5	116	32x3½	....	970	....	....	....
Piedmont 6-40	Cont.	6-3⅜x4½	122	32x4	....	1285	....	....	....
Pierce-Arrow	Own.	6-4 x5½	138	33x5	7000	‡6500	6500	8000	8500
Pilot 6-45	Teeter	6-3½x5	120	32x4	††500	1500	....	....	....
Pilot 6-50	H-S.	6-3½x5	126	32x4½	2050	2000	2050	2950	3000
Porter 46	Own.	4-4 x6¾	142	35x5	6750	6750	6750	....	7800
Premier 6-D	Own.	6-3⅜x5½	126¾	33x5	3150	‡3100	3250	....	5000
Premocar 6-40 A	Falls.	6-3½x4¾	117	32x4	1295	1295	....	1945	1995
R & V Knight R	Own.	4-3¾x5	116	32x4	....	1850	....	2650	2750
R & V Knight J	Own.	6-3½x5½	127	32x4½	2750	2750	2750	3350	3450
Reo Series B-T6 & U6	Own.	6-3⅞x5	120	33x4	1595	....	1595	2355	2435
ReVere C	Dues.	4-4½x6	131	32x4½	3200	3200	3200	....	4000
Rickenbacker A	Own.	6-3½x3¾	117	32x4	....	1485	....	1885	1985
Roamer 6-54-E	Cont.	6-3½x5½	128	32x4½	2850	2585	‡2750	3850	3850
Roamer 4-75-E	Dues.	4-4½x6	128	32x4½	3985	‡3585	‡3750	....	‡4650
Rolls-Royce	Own.	6-4½x4¾	143½	33x5	U. S.	Chassis	Price	‖11750	....
Romer R-22	Cont.	6-3¼x4½	120	33x4	1975	1975	2050	2400	2700
Saxon 125	Own.	4-3½x5	112	32x4	1195	1195	....	1795	1795
Sayers Six DP	Cont.	6-3¼x4½	118	33x4	1695	1695	....	2795	2795
Seneca L & O	LeR.	4-3½x4½	108	30x3½	945	945	....	....	....
Seneca 50 & 51	Lyc.	4-3½x5	112	31x4	1095	1095	....	....	....
Southern Six 660-2	H-S.	6-3¼x5	127	32x4½	2375	2375	2395	....	....
Sperling, A	Supr.	4-3⅜x5	114	32x4	980	980	....	1685	1685
Standard J	Own.	8-3¼x5	127	34x4½	2500	‡2500	2500	3250	3500
Stanley Steamer	Own.	2-4 x5	130	34x4½	2800	2600	2600	3775	3850
Stanwood Six	Cont.	6-3¼x4½	118	33x4	1765	1765	....	2750	....
Stearns SKL4	Own.	4-3⅜x5⅜	125	34x4½	2250	2250	2450	3150	3450
Stephens 90	Own.	6-3¼x4½	122	33x4½	1675	††1745	*1745	2650	2650
Stevens-Duryea E	Own.	6-4⅞x5½	138	35x5	7250	‡6900	6800	....	‡8900
Studebaker Light Six	Own.	6-3½x4½	112	32x4	1045	1045	....	1375	1750
Studebaker Special Six	Own.	6-3½x5	119	32x4	1425	1475	‡1475	2150	2350
Studebaker Big Six	Own.	6-3⅞x5	126	33x4½	....	....	1785	2500	2700
Stutz	Own.	4-4½x6	130	32x4½	2950	‡2990	*2990	3990	4450
Templar A-445	Own.	4-3⅜x5½	118	32x4	1985	1985	....	2785	2785
Texan A-38	Lyc.	4-3½x5	115	33x4	1195	1195	....	....	....
Texan C-12	H-S.	4-3½x5	115	33x4	1350	1350	....	....	....
Tulsa E-1-2-3	H-S.	4-3½x5	117	33x4	1175	1175	....	....	....
Tulsa F-1	H-S.	6-3¼x5	119	33x4	1585	1585	....	....	....
Velie 48	Cont.	6-3¼x4½	115	32x4	1585	1585	††800	2485	2485
Velie 34	Falls.	6-3¼x4½	112	32x3½	1235	1235	....	1750	2085
Velie 58	Own.	6-3½x4¼	115	32x4	1395	1395	....	2085	2085
Vogue 6-55	H-S.	6-3¼x5	124	32x4	....	1885	1960	2785	2885
Vogue 6-66	Cont.	6-3½x5¼	124	33x4½	....	2085	2160	2885	2985
Waltham 6	Own.	6-3½x5	120	32x4	2350	....	2350	3050	3150
Washington	Cont.	6-3½x4½	116	32x4	....	1785	....	....	....
Washington Jr.	Falls.	6-3¼x4¼	116	32x4	....	1635	....	....	....
Westcott C-48	Cont.	6-3½x5¼	125	32x4½	....	2090	2090	....	3490
Westcott A-44	Cont.	6-3¼x4½	120	32x4	1890	1890	‡2190	2890	2890
Wills Sainte Claire A-68	Own.	8-3¼x4	121	32x4½	2475	2475	....	3275	3475
Willys-Knight 20	Own.	4-3⅜x4½	118	33x4	1475	1525	....	2195	2395
Winther 61	H-S.	6-3¼x5	120	32x4½	....	....	2250	....	....
Winton 40	Own.	6-3¾x5¼	132	35x5	3400	†3600	3400	4450	4550

*—6-passenger. †—4-passenger. ‡—3-passenger. **—Price without starter and demountable rims. Price with starter and demountable rims $414. ††—Price without starter and demountable rims. Price with starter and demountable rims $443.

Engine Make: Anst—Ansted. Bea—Beaver. Cont—Continental. Curt—Curtiss. D.Ly—Dort Lycoming. Dues—Duesenberg. H-S—Herschell-Spillman. LeR—Leroy. Lyc—Lycoming. Nort—Northway. Roch—Rochester. Rut—Rutenberg. Weid—Weidely. Wisc—Wisconsin.

§Model 47—34 x 4½ Tires.

Specifications of Current Motor Truck Models

NAME AND MODEL	Tons Capacity	Chassis Price	Bore and Stroke	TIRES Front	TIRES Rear	Final Drive
Acason	¾	$1650§	3¾x5	34x5†	34x5†	W
Acason, R	1	2260	3¾x5¼	36x3½	36x5	W
Acason, RB	1½	2485	3¾x5¼	36x3½	36x6	W
Acason, H	2½	3295	4⅜x5¾	36x4*	36x8*	W
Acason, L	3½	4295	4⅜x5¾	36x5*	36x10*	W
Acason, M	5	5250	5 x6¼	36x6	40x12	W
Ace, C	1½	2295	3¾x5⅛	34x3½*	34x5*	W
Ace, A	2½	2795	4¼x5½	36x4*	36x7	W
Acme, G	¾	....	3¾x5	35x5†	35x5†	W
Acme, B	1	....	3¾x5	34x3½	34x5	W
Acme, F	1½	....	3¾x5	34x3½	34x5	W
Acme, A	2½	....	4⅛x5¼	36x4	36x7	W
Acme, AC	2½	....	4⅛x5½	36x4	36x7*	W
Acme, C	3½	....	4½x5½	36x5	40x10	W
Acme, E	5	....	4⅝x6	36x6	40x12	W
Akr'nMulti-Trk20	1¼	1695	4 x5¼	34x5	34x5	B
American, 25	2½	3350	4 x6	36x4*	36x4d*	W
American, 40	4	4275	4½x6	36x5*	36x5d*	W
Apex, G	1	1450††	3½x5	33x5†	33x5†	I
Apex, D	1½	1915	3¾x5⅛	34x3½	34x4	I
Apex, E	2½	2695	4¼x5½	36x4	36x7	I
Apex, F	3½	3975	4½x6	36x5	36x10	I
Armleder, 20	1	....	3¾x5¼	34x3½*	34x5*	W
Armleder, 21	1½	....	3¾x5¼	34x3½	34x6	W
Armleder, 21	1½	....	3¾x5¼	34x3½	34x6	W
Armleder, 40	1½	....	4½x5¼	34x3½	34x6	W
Armleder, 40	1½	....	4½x5¼	34x3½	36x6	W
Armleder, HW	2½	....	4¼x5½	36x4*	36x7*	W
Armleder, KW	3½	....	4½x6	36x5	36x5d	W
Atco, B	1½	....	3¾x5¼	34x5†	36x6†	W
Atco, B1	1½	....	3¾x5¼	34x5†	36x6†	I
Atco, A	2½	....	4¼x5½	36x4†	36x8*	W
Atlas, M.D.	1	1185	3½x5	32x4½†	32x4½†	W
Atterbury, 20R	1½	2475	3¾x5	34x3½	34x5	W
Atterbury, 7CX	2½	3175	4½x5¼	36x4	36x4d	W
Atterbury, 7D	3½	3975	4½x5½	36x5	40x5d	W
Atterbury, 8E	5	4975	4¾x6	36x5	40x6d	W
Autocar, 21UF	1½-2	1950	4¼x4½	34x4*	34x5*	D
Autocar, 21UG	1½-2	2050	4¼x4½	34x4*	34x5*	D
Autocar, 27H	2	2950	4 x5½	34x5	36x7	D
Autocar, 26Y	5	3950	4¼x5½	34x6	36x12	D
Autocar, 26-B	5	4100	4¼x5½	34x6	36x12	D
Available, H1½	1½	2475	4 x5⅛	36x3½*	36x5*	W
Available, H2	2	2775	4 x5⅛	36x3½*	36x6*	W
Available, H2½	2½	3160	4 x5⅛	36x4*	36x8*	W
Available, H3½	3½	4175	4½x5½	36x5	40x5d	W
Available, H5	5	5375	4¾x6	36x6	40x12	W
Avery	1	....	3 x4	34x5†	34x5†	I
Beck, A Jr.	1	1950	3¾x5	34x3½	34x4	I
Beck, C	2	2550	4½x5½	36x4	36x6	I
Bell, M	1	1495	3⅝x5⅛	35x5	35x5†	W
Bell, E	1½	2100	3¾x5¼	34x3½	34x5	I
Bell, O	2½	2550	4½x5½	34x4	34x6	I
Belmont, A	½	725	3¾x4¼	31x4	31x4	B
Belmont, D	2	2575	4½x5½	34x3½*	34x6*	I
Belmont, F	3	3500	4 x6	36x5*	36x5d*	I
Bessemer, G	1	1395	3½x5	35x5†	35x5†	I
Bessemer, H-2	1½	1995	3¾x5	36x3½	36x5	I
Bessemer, J-2	2½	2595	4½x5¼	36x4	36x4d	I
Bessemer, K-2	4	3495	4½x5½	36x5	36x10	I
Big 4, H	3½-4	5000	4½x6	36x6	36x6	W
Big 4, T	4	5500	4¾x6	36x6	36x6	W
Big 4, K	7	6000	5½x6	36x6	36x6	W
Big 4, HA	7	6000	4½x6	36x6	36x10	W
Brinton, C	1½	1500	3¾x5	34x4	34x5	W
Brinton, D	2½	2250	4⅝x5¼	36x4	36x7	W
Brockway, E	1	....	3¾x5⅛	35x5†	35x5†	B
Brockway, S-5	1½	....	3¾x5	36x3½*	36x5*	W
Brockway, SK	1½	....	4½x5¼	36x4	36x6	
Brockway, KR	2½	....	4½x5½	36x4	36x8	
Brockway, K-5	2½	....	4½x5¼	36x4	36x8	W
Brockway, RT	3½	....	4¾x6	36x5	36x10	
Brockway, R-4	3½	....	4½x5½	36x5	36x5d	W
Brockway, T-4	5	....	4¾x6	36x6	40x6d	W
Capitol, G1½	1½	2975	3¾x5	35x5	38x7	W
Capitol, H2½	2½	3700	4¼x6	36x4	36x8	W
Capitol, K2½	2½	4250	4¼x6	36x6	42x9	W
Capitol, M3½	3½	4425	4¼x6	36x5	36x10	W
Case	2	....	4¼x5¾	36x6	38x7	I
Champion Light Commercial	½	1195	3½x5	32x3½	32x3½	I
Chevrolet, G	¾	745	3⅛x4	31x4†	34x4½†	B
Chevrolet, T	1	1125	3⅛x5¼	33x4†	35x5†	W
Chicago, C1½	1½	....	3¾x5⅛	36x3½*	36x5*	W
Chicago, C2½	2½	....	4 x5⅛	36x4*	36x7*	W
Chicago, C3½	3½	....	4½x5½	36x5	36x10	W
Chicago, D5	5	....	4½x5½	36x6	40x12	W
Climber, A-20	1½	2450	3½x5	36x6*	38x7*	I
Clydesdale, 18	¾	1890	3¾x5	34x5	34x5	W
Clydesdale, 32C	1	2375	3¾x5¼	34x3½*	34x5*	W
Clydesdale, 42C	1½	2475	4 x3½	36x3½	36x5	W
Clydesdale, 65C	2½	3250	4¾x5½	36x4	36x7	W
Clydesdale, 65EC	2½	3450	4½x5½	36x4	36x7	W
Clydesdale, 90C	3½	4100	4½x5½	36x5	40x10	W
Clydesdale, 120C	5	4500	4¾x6	36x6	40x12	W
Collier, 18	1	2350	3¾x5	34x4	34x5	W
Collier, 19	1½	2550	3¾x5	36x4	36x6	W
Collier, 21	2	2950	4¼x5¼	36x4	36x7	W
Collier, 22	2½	3250	4¼x5¼	36x4	36x4	W
Columbia, H	1½	1875	3¾x5	34x3½	34x5	I
Columbia, G	2½	2335	4 x5¼	36x4	36x7	I
Comet T	1½	1950	3¾x5	34x4	34x4	W
Commerce, T	¾-1¼	1450	3¾x5	34x4½†	34x4½†	B
Commerce, 12	1½	1800	3¾x5	35x5†	35x5†	I
Commerce, 16	2	2150	3¾x5	35x5†	35x6†	I
Commerce, 18	2½	$2495	4¼x5¼	36x6†	36x7†	I
Concord, A	2	3150	4 x5½	36x3½	36x6	W
Concord, B	3	3600	4¼x5½	36x4	36x8	W
Concord, AX	2	3250	4 x5½	36x3½	36x6	W
Concord, BX	3	3600	4½x5½	36x4	36x8	W
Cook, 51	2½	3500	4 x5⅛	36x6†	40x8†	I
Corbitt, H-22	1	1480	3¾x5	34x3½	34x4	W
Corbitt, E-22	1½	2200	3¾x5	34x3½	34x4	W
Corbitt, C-22	2	2600	4½x5¼	36x3½	36x6	W
Corbitt, B-22	2½	3000	4½x5¼	36x4	36x7	W
Corbitt, R-22	3	3200	4¼x5½	36x4	36x8	W
Corbitt, A-22	3½-4	3800	4¼x5½	36x5	36x10	W
Corbitt, AA-22	5	4500	4¾x6	36x6	40x6d	W
Day-Elder, AS	1	1600	3¾x5	35x5†	35x5†	W
Day-Elder, B	1½	2000	3¾x5	34x3½	34x5	W
Day-Elder, D	2	2400	4½x5¼	36x4	36x7	W
Day-Elder, C	2½	2750	4¼x5½	36x4	36x7	W
Day-Elder, F	3½	3150	4½x5½	36x5	36x5d	W
Day-Elder, E	5	4250	4½x6	36x5*	40x6d*	W
Dearborn, E	1	1690	3⅝x5½	35x5	35x5	W
Dearborn, FX	1½	2300	3¾x5⅛	34x4	34x5	W
Dearborn, F	1½	2180	3¾x5⅛	34x4	34x5	W
Dearborn, 48	2	2590	3¾x5⅞	34x4½	34x7	W
Defiance, G	1	1695§	3¾x5	35x5†	35x5†	B
Defiance, D	1½	2095§	3¾x5	35x5†	36x6†	I
Defiance, E	2	2275§	3¾x5	35x5†	38x7†	I
DeMartini, 1½	1½	2600	3¾x5	34x3½	34x6	W
DeMartini, 2	2	3300	4 x5½	36x3½	36x7	W
DeMartini 3	3	4250	4¼x5½	36x4	36x10	W
DeMartini 4	4	4800	4½x6	36x5	36x12	W
Denby, 31	1¼	1485	3½x5	35x5†	35x5†	B
Denby, 33	1½	2145	3¾x5	35x5†	38x7†	I
Denby, 34	2	2395	3¾x5	36x3½	36x6	I
Denby, 35	2½-3	2795	4½x5¼	36x4	36x7	I
Denby, 27	4	3895	4½x5½	36x5	36x5d	I
Denby, 210	5	4295	4½x5½	36x6	40x6d	I
Dependable, A	¾-1	1650	3⅝x5⅛	34x5	36x6	W
Dependable, C	1½	2350	3¾x5¼	34x3½	34x5	W
Dependable, D	2	2650	4 x5½	34x5	36x6	W
Dependable, E	2½	2950	4¼x5½	36x4	36x7	W
Dependable, G	3½	3550	4½x6	36x6	38x7	W
Diamond T, O-3	1-1¼	1975	3¾x5¼	36x3½†	36x4†	W
Diamond T, FS	1½	2525	3¾x5¼	36x3½	36x5	W
Diamond T, T	1½	2250	3¾x5¼	36x3½	36x5	W
Diamond T, U	2	2650	4 x5¼	36x4	36x7	W
Diamond T, K	3½	3750	4¼x5½	36x5	36x5d	W
Diamond T, EL	5	4325	4½x5½	36x6	40x6d	W
Diamond T, S	5	4500	4¾x6	36x6	40x6d	W
Diehl, A	1	....	3½x5	34x4½	35x5	I
Diehl, B	1½	....	3½x5	36x6	36x6	I
Dispatch, F	1	1350	3¾x5	34x4†	34x4†	I
Doane	2½	4100††	4¼x5¾	36x5	36x7	C
Doane	3½	5100††	4⅜x5¾	36x5	36x5d	C
Dodge Brothers	½	6000†††	5 x6¼	36x6	40x6d	C
Dorris, K-4	2-2½	885	3⅞x4½	32x4†	32x4†	B
Dorris, K-7	3½	3400	4¼x5½	36x4	36x7	W
Dort, 103	½	4400	4¼x5½	36x5	36x10	W
Double Drive B	3	685	3½x5	31x4	31x4	B
Duplex, A	1½	4000	4¼x5½	6	6	W
Duplex, E	3½	2775	4 x5¼	35x5†	38x7†	W
Duty, 22	2	4250	4¼x5½	36x8	36x8	I
		1590	3½x5	34x3½	34x5	I
Eagle, 100-X	1½	....	3⅝x5½	34x5	34x5	I
Eagle, 100-2	2	2275	3¾x5¼	34x4*	34x7*	I
Erie, E	1½	....	3¾x5¼	36x6†	36x6†	W
Erie, A	2½	....	4¼x5½	36x4	36x4d	W
F.W.D., B	3	4200	4¾x5½	36x6	36x6	B
Facto, 1921	2½	2295§	4¼x5½	36x4*	36x8*	W
Fageol, 1½	1½	3000	3¾x5¼	34x3½*	34x6*	W
Fageol, 2½	2½	3900	4¼x5¾	34x4	36x7	W
Fageol, 3½	3½	5000	4½x6¼	36x5*	40x5d*	W
Fageol, 5	5	5700	4½x6¼	36x6	40x6d	W
Fargo, R	2	1900	3¾x5	36x4	36x6	I
Federal, SD	1½	1800	3¾x5	35x5†	36x6†	W
Federal, TE	1½	2175	4½x5¼	36x3½	36x5	W
Federal, UE	2	2425	4½x5¼	36x4	36x7	W
Federal, WE	3½	3150	4½x5½	36x5	36x5d	W
Federal, X2	5-6	4500	4¾x6	36x6	40x6d	W
Ford, TT	1	430	3¾x4	30x3½*	32x4½*	W
Forschler, A	1	....	3½x5	34x3	34x4	W
Forschler, AX	1½	....	3½x5	36x3½	36x5	W
Forschler, B	2	....	4½x5¼	36x4	36x7	W
Forschler, BX	3	....	4½x5¼	36x4	36x8	W
Front Drive C	1½	2800	3¾x5½	5	4	W
G & J** 20	1	2275	3⅝x5½	34x5†	34x5†	W
G & J** A	2-2½	3375	4x5¼	36x4	36x7	W
G & J** B	3½-4	4475	4½x5½	36x5	36x5d	W
G.M.C., K16	1	1495	3½x5½	34x5†	34x5†	B
G.M.C., K41 A	2	2775	4 x5½	36x4*	36x7*	W
G.M.C., K71 A	3½	3950	4½x6	36x5	40x5d	W
G.M.C., K101A	5	4350	4½x6	36x5	40x6d	W
G.W.W.	1½	1950	3¾x5½	35x5	35x5	I
Garford, 15	¾	$1590	3⅝x5½	34x5†	34x5†	W
Garford, 25	1¼	1990	3¾x5½	36x3½	36x4	W
Garford, 70-H	2	2750	4½x5½	36x4	36x7	W
Garford, 77D	3½	3750	4½x6	36x5	36x6d	W
Garford, 68D	5	4500	5 x6½	36x6	40x6d	W
Garford, 150-A	7½	5200	5x6½	36x6	40x7d	C
Gary, F	1	2100	3¾x5	36x3½	36x4	W
Gary, I	1½	2550	4 x5½	36x3½	36x5	W
Gary, J	2½	3150	4¼x5½	36x4	36x7	W
Gary, K	3½	4050	4½x6	36x5	40x5d	W
Gary, M	5	5150	5 x6½	36x6	40x6d	W
Gersix, M	1½	3100	4 x5½	36x3½	36x7	W
Gersix, K	2½	3500	4½x5½	36x4	36x8	W
Gersix	3½	4500	4½x6	36x5	40x12	W
Golden West, GH	3	4500	4½x6	36x7	36x7	W
Golden West, G	3½	5000	4½x5½	36x6	36x6	W
Graham Bros. 1-Ton	1	1265	3⅞x4½	33x4½	34x5†	B
Graham Bros. 1½-Ton	1½	1325	3⅞x4½	33x4½†	36x6†	B
1Gramm-Pion. 10	1	1365§	3½x5	33x5†	33x5†	F
1Gramm-Pion. 15	1½	1900§	3¾x5	36x3½*	36x5*	I
1Gramm-Pion. 65	1½	2500§	3¾x5	36x3½*	36x5	W
1Gramm-Pion. 20	2	2925§	4½x5¼	36x4*	36x7*	W
1Gramm-Pion. 30	3	3275§	4½x5½	36x4*	36x4d*	W
1Gramm-Pion. 40	4	3995§	4½x5½	36x5	36x5d*	W
1Gramm-Pion.75-P	3½	4225§	4½x5½	36x6†	42x9†	W
1Gramm-Pion. 50	5-6	4895§	4½x6	36x6	40x6d*	W
Hahn, J4	1	....	3¾x5	34x5*	34x5*	W
Hahn, CD	1½	....	4½x5¼	36x3½*	36x6*	W
Hahn, EE	2½	....	4½x5½	36x4*	36x8*	W
Hahn, F	3½	....	4½x5½	36x5*	36x10*	W
Hahn, EF	5	....	4¾x6	36x6	40x12	W
Hal-Fur, E	1½	2350	4 x5¼	34x5†	38x7†	W
Hal-Fur, B	2½	3000	4½x5½	35x5*	38x7*	W
Hal-Fur, F	3½	4000	4½x5½	36x6†	40x10†	W
Hall, 1½	1½	3100	3¾x5	34x5†	38x7†	W
Hall, 2½	2½	3275	4½x5¼	36x4	36x6	W
Hall, 3½	3½	4100	4½x5½	36x5	36x5d	W
Hall, 5	5	5100	4½x5½	36x5	40x6d	W
Hall, 7 chain	7	5100	4½x5½	36x5	40x6d	C
Harvey, WOA	2	2650	4¼x5½	34x4	34x7	W
Harvey, WFA	2½	2950	4¼x5½	36x4	36x7	W
Harvey, WHA	3½	3950	4½x6¼	36x5	36x5d	W
Hawkeye, K	1½	1850	3¾x5½	34x3½*	34x5*	I
Hawkeye, M	2	2650	4¼x5	36x4*	36x6*	I
Hawkeye, N	3½	3700	4½x6¾	36x5*	36x10*	I
Hendrickson, N	2½	3150	4¼x5¾	36x4*	36x7*	W
Hendrickson, M	3½	3975	4¼x5	36x5*	36x5d*	W
Huffman, B	1½	1995	3¾x5	34x3½	34x6	W
Huffman, C	1½	1795	3¾x5½	34x3½	34x6	I
Hurlburt A	1½	2850	4 x5½	34x4	34x5	W
Hurlburt B	2½	3750	4¼x5½	36x4	36x4d	W
Hurlburt C	3½	4590	4½x6	36x5	36x5d	W
Hurlburt D	5	5500	4½x6	36x5	40x6d	W
Indep'd't(Iowa), B	1	1665	3½x5	34x3½	34x4	I
Indep'd't(Iowa), G	1½	2040	3¾x5¼	34x3½	34x5	I
Indep'd't(Ia.), H.I	2½	2940	4½x5¼	36x4	36x4	I
Indep'd't(Ohio), F	1½	2385	3¾x5	36x3½	36x5	W
Indep'd't(Ohio), H	2½	3085	4½x5¼	36x4	36x4d	W
Indep'd't(Ohio), K	3½	3985	4½x5½	36x5	36x5d	W
Indiana, 12	1½	....	3¾x5¼	34x3½*	34x5*	W
Indiana, 20	2	....	4½x5½	36x4*	36x7*	W
Indiana, 25	2½	....	4½x5½	36x4*	36x8*	W
Indiana, 35	3½	....	4⅜x5½	36x5*	36x5d*	W
Indiana, 51	5	....	5 x6¼	36x5*	40x6d*	W
Inland, D	2	2950	4 x5	34x5	34x6	I
International, S	¾	1500	3½x5	34x5†	34x5†	I
International, 21	1	1750	3½x5¼	36x3½	36x3½	I
International, 31	1½	1850	3½x5¼	36x3½	36x4	I
International, 41	2	2100	3½x5¼	36x3½	36x5	I
International, 61	3	2400	4¼x5	36x4	36x6	I
International, 101	5	3600	4¼x5	36x5	40x10	I
J & J, D	2	3250	4 x5	34x4*	34x6	I
Jackson, 4WD	3½	3850	4½x5½	36x7	36x7	B
Jumbo, 15	1½	2425	3¾x5½	36x3½	36x5	I
Jumbo, 20	2	2675	3¾x5¼	35x5†	38x7†	I
Jumbo, 25	2½	3090	4½x5½	36x4	36x7	I
Jumbo, 30	3	3590	4¼x5½	36x6†	42x9†	I
Jumbo, 35	3½	4080	4½x6	36x5	36x10†	I
Jumbo, 40	4	4730	4½x6	38x7†	44x10	I
K-Z, 1	1	1750	3½x5	34x3½	34x5	W
K-Z, 1½	1½	2075	3¾x5	36x4	36x6	W
K-Z, 2½	2½	2550	4½x5¼	36x4	36x8	W
K-Z, 3½	3½	3350	4½x5½	36x5	40x10	W
K-Z, 5	5	3850	4½x5½	36x6	40x6d	W
Kalamazoo, G-1	1½	2495	3¾x5	34x4	34x5	W
Kalamazoo, G-2	1½	2800§	3¾x5	36x4	36x6	W
Kalamazoo, H	2½	3275§	4 x6	36x4	36x8	W
Kalamazoo, K	3½	4000§	4½x6	36x5	36x10	W
Kalamazoo K-5	5	4500§	4½x6	36x6	36x6d	W
Karavan, A	2½	3900	4¼x6	36x4	36x8	W
Kearns, H	1	1600	3½x5	32x4½†	32x4½†	I
Kearns, N	2	2200	3½x5	34x3½	34x6	I
2Kelly-S., K-31	1½	2700	3¾x5¼	36x3½	36x6	C
2Kelly-S., K-34	1½	2700	3¾x5¼	36x3½	36x6	W
2Kelly-S., K-38	2½	2900	3¾x5¼	36x4	36x4d	W
2Kelly-S., K-35	2½	2900	3¾x5¼	36x4	36x4d	C
2Kelly-S., K-40	3½	2900	4½x6¼	36x5	40x5d	C
2Kelly-S., K-41	3½	3900	4½x6½	36x5	40x5d	I
2Kelly-S., K-42	3½	3900	4½x6½	36x5	40x5d	W

*2-cyl. †6-cyl. ‡8-cyl. All others, not marked, are 4-cyl. Trac., Tractor. **Canadian made.

Final Drive: W—Worm, I—Internal Gear, C—Chains, D—Double Reduction, B—Bevel, 4—Four-Wheel, E—External Gear. *Tires—optional. †Pneumatic Tires. All others solid. ††Price includes body. §—Price includes several items of equipment.

1—Gramm-Pioneer. 2—Kelly-Springfield.

Specifications of Current Motor Truck Models—Continued

NAME AND MODEL	Tons Capacity	Chassis Price	Bore and Stroke	TIRES Front	TIRES Rear	Final Drive
[2]Kelly-S., K-50	5	....	4½x6½	36x6	40x6d	C
[2]Kelly-S., K-60	6	....	4½x6½	36x6	40x7d	C
Keystone, 40	2	$2450	3¾x5½	34x5†	38x7†	I
Kimball, AB	2	3675	4 x6	36x4	36x7	W
Kimball, AC	2½	3975	4½x6	36x4	36x8	W
Kimball, AK	3	4500	4½x6	36x4	36x10	W
Kimball, AE	4	5000	4¾x6	36x5	40x12	W
Kimball, AF	5	5800	5 x6	36x6	40x7d	W
Kissel, Express	1	1985†‖	3½x5½	34x5†	34x8†	W
Kissel, Utility	1½	1975	3½x5½	36x3½	36x5	W
Kissel, Freighter	2½	2875	4½x5½	36x4	36x7	W
Kissel, H. D.	4	3675	4½x5½	36x5	36x5d	W
Kleiber, AA	1	2600	4½x5½	34x3½*	34x5*	W
Kleiber, A	1½	3100	4½x5½	36x3½*	36x6*	W
Kleiber, BB	2	3600	4½x5½	36x4*	36x7*	W
Kleiber, B	2½	3950	4½x5½	36x5*	36x8	W
Kleiber, C	3½	4600	4½x5½	36x5	36x5d	W
Kleiber, D	5	5300	5 x6½	36x6	40x12	W
Koehler, D	1½	1995	3½x5	34x3½	34x5	W
Koehler, M	2½	3175	4 x5½	36x4	36x7	W
Koehler, MCS	2½	3275	4 x5½	36x4	36x7	W
Koehler, F	3½	4150	4½x5½	36x5	36x10	W
Koehler, MT, Trac	5	3275	4 x5½	36x4	36x7	W
Lange, B	2½	3350	4½x5¼	36x4*	36x7*	C
Larrabee, X-Z	1	1925	3¼x4½	34x5†	34x5†	B
Larrabee, U	1½	2400	3¾x5	34x3½	34x5	W
Larrabee, K	2½	3200	4½x5¼	36x4	36x7	W
Larrabee, L-4	3½	4000	4½x5½	36x5	36x5d	W
Larrabee, W	5	4800	4¼x6	36x6	40x6d	W
Luedinghaus, C	1	1695	3½x5	35x5†	35x5†	W
Luedinghaus, W	1½	2490	3¾x5¼	31x3½*	34x5*	W
Luedinghaus, K	2-2½	3150	4¼x5¾	36x1*	36x7*	W
Maccar, L	1½	2700	4½x5½	36x4	36x6	W
Maccar, H-A	2	3100	4½x5¼	36x4	36x4d	W
Maccar, H-2	3	3400	4½x5½	36x4	36x5d	W
Maccar, H-3	4	4200	4½x5½	36x5	36x6d	W
Maccar, G	5-6	4950	4¾x6	36x5	40x6d	W
MacDonald, A	7½	5750	6½x6	10x7	40x14	I
Mack, AB D.R.	1½	3450	4 x5	36x4	36x3½d	D
Mack, AB Chain	1½	3000	4 x5	36x4	36x3½d	C
Mack, AB Chain	2	3300	4 x5	36x4	36x4d	C
Mack, AB D.R.	2	3750	4 x5	36x4	36x4d	D
Mack, ABDR	2½	3850	4 x5	36x4	36x4d	D
Mack, AB	2½	3400	4 x5	36x4	36x4d	C
Mack, AC Chain	3½	4950	5 x6	36x5	40x5d	C
Mack, AC Chain	5	5500	5 x6	36x6	40x6d	C
Mack, AC Chain	6½	5750	5 x6	36x6	40x12	C
Mack, AC Chain	7½	6000	5 x6	36x7	40x7d	C
Mack Trac, AB	5	3400	4 x5	36x4	36x4d	C
Mack Trac., AC	7	4950	5 x6	36x5	40x5d	C
Mack Trac. AC	10	5500	5 x6	36x6	40x6d	C
Mack Trac., AC	13	5750	5 x6	36x6	40x12	C
Mack Trac., AC	15	6000	5 x6	36x7	40x7d	C
Mapleleaf, AA**	2	3775	4 x5¼	36x4	36x7	W
Mapleleaf, BB**	3	4350	4¼x5½	36x4	36x4d	W
Mapleleaf, CC**	4	5100	4½x5½	36x5	36x5d	W
Mapleleaf, DD**	5	6200	4½x5½	36x6	40x6d	W
Master, JW	1½	2290	3¼x5½	34x3½	34x5	W
Master, JD	1½	2590	4½x5½	34x3½	34x5	D
Master, Z	2	2290	4½x5½	34x3½	34x5	W
Master, W	2½	2800	4¼x5½	34x4	36x7	W
Master, D	2½	3190	4¼x5½	34x4	36x7	D
Master, A	3½	3990	4½x6	36x5	40x5d	W
Master, E	3½	4290	4½x6	36x5	40x5d	D
Master, Y	4	4490	4½x6	36x5	40x6d	D
Master, B	5	4990	4¾x6½	36x6	40x6d	W
Master, F	5	5090	4¾x6½	36x6	40x6d	D
Master Trac., DDT	6	3390	4¼x5½	34x4	36x7	D
Maxwell, 1½	1½	932	3½x4½	32x3	32x4	W
Menominee, HT	1	2000	3¾x5	34x3½	36x5	W
Menominee, H	1½	2175	4 x5	36x3½	36x5	W
Menominee, D	2	2875	4 x6	36x4	36x8	W
Menominee, G	3½	3800	4½x6	36x5	36x10	W
Menominee, J-3	5	4850	4¾x6	36x6	40x12	W
Moline, 10	1½	1985	3½x5	34x5†	36x6†	I
Moreland, 21B	1½	2800	4½x5¼	36x3½	36x6	W
Moreland, 21C	2½	3500	4½x5½	36x4	36x8	W
Moreland, 21H	3½	4600	4¾x6	36x5	40x5d	W
Moreland, 21J	5	5000	4¾x6	36x6	40x6d	W
Napoleon, 7	¾	1350	3½x5	38x4	33x4†	I
Napoleon, 9	1	1535	3½x5	35x5*	35x5*	I
Napoleon, 11	1½	1860	3½x5	35x5*	36x6*	I
Nash, 2018	1	1895	3¾x5¼	35x5	36x6	I
Nash, 3018	2	2550	3¾x5¼	36x6	40x8	I
Nash, Quad.	2	3250	4¼x5½	40x8	40x8	I
Nash, 5018	2½	2550	3¾x5¼	34x4	34x6	I
[3]Nelson, F1½	1½	....	4½x5¼	36x3½	36x5	W
[3]Nelson, F2	2	....	4½x5¼	36x4	36x7	W
[3]Nelson, F3½	3½	....	4½x5½	36x5	36x5d	W
[3]Nelson, FC5	5	....	4¾x6	36x6	40x6d	W
Netco, D	2	3100	4½x5¼	36x4*	36x7*	W
Netco, H	2½	3500	4½x5½	36x4*	36x8*	W
New York, M	1½	....	4½x5¼	36x3½	36x5	W
New York, N	2-2½	....	4½x5¼	36x4	36x4d	W
Niles, E	2	3000	4½x5¼	36x4*	36x7*	W
Noble, B30	1½	2100	3¾x5¼	36x3½	36x5	W
Noble, C40	2	2675	4 x5½	36x4	36x7	W
Noble, D50	2½	2950	4¼x5½	36x4	36x8	W
Noble, E70	3½	3800	4½x6	36x5	36x10	W
Northway, B-2	2	3400	4 x6	36x4	36x4d	W
Northway, B-3	3½	4400	4 x6	36x5	40x5d	W
NorthwesternW	1½	2700	4¼x5½	34x4	36x6	W
Northwestern WS	2½	3500	4½x5½	36x4	36x8	W
Norwalk, 25E	1	1595	3½x5	34x3½	34x4	W
Norwalk, 35E	1½	1925	3½x5	34x3½	34x3½d	W
Norwalk, 35E.Spec	1½	2285	3¾x5¼	34x3½	34x5	W
O. K., K1	1½	2675	4 x5½	36x3½	36x5	W
O. K., L1	2½	$3450	4¼x5½	36x4	36x8	W
O. K., M1	3½	4250	4½x6	36x5	36x5d	W
Ogden, D	½	....	3¾x5	36x3½	36x5	W
Ogden, D	1½	....	3¾x5	36x3½	36x5	W
Ogden, E	2½	....	4½x5¼	36x4	36x8	W
Old Hickory, W	1	1775	3¾x5	36x3½*	36x4*	W
Old Reliable, A	1½	2350	4 x5	34x4	36x6	W
Old Reliable, B	2½	3500	4¼x6	34x4	36x4d	W
Old Reliable, C	3½	4250	4¼x6	36x5	36x5d	W
Old Reliable, D	5	5250	4¾x6	36x6	40x6d	W
OldReliable, KLM	7	6000	4¾x6½	36x6	40x7d	C
Oldsmobile Econ.	1	1095	3½x5¼	35x5†	35x5†	I
Olympic, A	2½	3200	4¼x5½	36x4	36x8	W
Oshkosh, A	2	3750	3½x5	36x6†	36x6†	4
Oshkosh, AA	2	3850	3½x6	36x6†	36x6†	4
Oshkosh, B	2½	4150	4 x5½	38x7†	38x7†	4
Oshkosh, BB	2½	4300	4 x5½	38x7†	38x7†	4
Packard, EC	1½-3	3100	4½x5½	36x4	36x7	W
Packard, EX	1½-3	3100	4½x5½	36x6†	40x8†	W
Packard, ED	2-4½	4100	4½x5½	36x5	36x5d	W
Packard, EF	4-7½	4500	5 x5½	36x6	40x6d	W
Paige, 52-19	1½	1950	4 x5¼	34x3½	34x5	W
Paige, 54-20	2½	2420	4¼x5½	34x4	34x8	W
Paige, 51-18	3½	3145	4½x5½	36x5	36x5d	W
Parker, F20	2	3500	4 x6	34x4	36x4d	W
Parker, J20	3½	4400	4½x6	36x5	40x5d	W
Parker, M20	5	5500	4¾x6	36x6	40x6d	W
Patriot, Revere	1	1500	3¾x5	35x5†	35x5†	W
Patriot, Lincoln	2	2050	4 5¼	34x3½	34x5	W
Patriot, Washgt'n	3	2900	4½x5½	36x4	36x7	W
Piedmont, 4-30	1	1200	3½x5	34x4†	34x4†	W
Pierce-Arrow	2	3200	4 x5½	36x4	36x4d	W
Pierce-Arrow	3½	4350	4½x6¾	36x5	36x5d	W
Pierce-Arrow	5	4850	4½x6¾	36x5	40x6d	W
Pioneer, 59	1	1550	3¾x4½	32x4½†	32x4½†	W
Pittsburgher	1½-2	3000	3¾x5	36x4	36x6	
Pittsburgher	3	3800	4½x5¼	36x5*	36x8	W
Power, F	2	3150	3¾x5¼	36x5	36x7	W
Power, C	3½	4250	4¼x5½	36x5	40x10	W
Premocar, B-143	1½	2475	3½x5	36x6†	36x6†	W
Rainier, R-21	¾	1990	3½x5	35x5†	35x5†	W
Rainier, R-19	1	2150	3½x5	34x3½	31x4	W
Rainier, R-16	1½	2490	3¾x5	34x3½	34x5	W
Rainier, R-18	2	2890	4½x5¼	34x4	34x6	W
Rainier, R-20	2½	3550	4½x5¼	34x4	34x7	W
Rainier, R-15	3½	4400	4½x5½	36x5	36x5d	W
Rainier, R-17	5	5100	4½x6	36x6	36x6d	W
Ranger, TK-22-2	2	2775	3¾x5	36x6†	38x7†	W
Reo, F	¾-1‡	1245	4½x4½	31x4½†	34x4½†	B
Reliance, 10A	1½	2400	4 x5½	36x3½	36x5	I
Reliance, 20B	2½	3100	4¼x5½	36x4	36x4d	I
Republic, 75	¾	1395††	3½x5	32x4½†	32x4½†	I
Republic, 10	1	1395	3¾x5	34x3	34x4	I
Republic, 10Exp.	1	1695	3¾x5	35x5†	34x5†	I
Republic, 11X	1½	1795	3¾x5	34x3½	34x6	I
Republic, 19	2½	2195	4½x5¼	36x4	36x7	I
Republic, 20	3½	3095	4½x5½	36x5	36x10	I
Rowe, CW	1½	3000	3¾x5	36x6†	36x6†	W
Rowe, C. D. W.	2	3300	4 x5	34x4	36x3½d	W
Rowe, G. S. W.	3	4150	4 x6	31x5	36x5d	W
Rowe, G. P. W.	3	5250	3¼x5‡	38x7†	42x9†	W
Rowe, HW	4	4500	4¼x6	36x5	36x6d	W
Rowe, F. W.	5	5500	4½x6	36x6	40x6d	W
Ruggles, 20	1	1195	3¾x5	34x5†	34x5†	B
Ruggles, 40	2	1795	4 x5	34x5†	34x7	D
Sandow, G	1	2295	3¾x5	34x3½	34x5	W
Sandow, CG	1½	2590	3¾x5	31x4	34x6	W
Sandow, J	2½	3275	4½x5¼	36x4	36x7	W
Sandow, M	3½	4295	4½x5½	36x5	36x5d	W
Sandow, L	5	4975	4½x5½	36x6	40x6d	W
Sanford, 25	2½	....	4½x5¼	36x4	36x4d	W
Sanford, 35	3½	....	4½x5½	36x5	36x5d	W
Sanford, 50	5	....	4¾x6	36x5	40x6d	W
Schacht, 2-Ton	2	3200	4¼x5½	36x4	36x7	W
Schacht, 3-Ton	3	3800	4¼x5½	36x5	36x5d	W
Schacht, 4-Ton	4	4200	4½x6	36x5	40x5d	W
Schacht, 5-Ton	5	4400	4½x6	36x5	40x6d	W
Schacht, 7-Ton	7	5000	4½x6	36x6	40x7d	W
Schwartz, A	1	1675	3½x5	33x4½†	33x4½†	B
Schwartz, BW	1½	2690	3¾x5¼	31x3½*	34x7*	W
Schwartz, C.W.S.	2½	3200	4¼x5½	36x4	36x8	W
Schwartz, DW	5	4900	4½x6	36x6	40x12	W
Selden, 30	1½	2250	3¾x5	34x3½	34x5	W
Selden, 31	1½-2½	3350	4¼x5¼	34x5	38x7	W
Selden, 50	2½	3250	4½x5¼	36x4	36x7	W
Selden, 51	2½-3½	4350	4½x5½	36x6†	40x8†	W
Selden, 70	3½-5	3750	4½x5½	36x5	36x10	W
Selden, 90	5-7	4950	4¾x6	36x6	40x12	W
Seneca, M	½	920	3½x4½	30x3½†	30x3½†	B
Service, 12	¾	....	3¼x4½	32x4½†	32x4½†	B
Service, 15	1½	....	3¾x5	31x4½†	35x5†	B
Service, 220	1½	....	3½x5¼	34x3½	34x5	W
Service, 31	2	....	4 x5½	36x3½	36x6	W
Service, 36	2	....	4¼x5½	35x5†	38x7†	W
Service, 51	2½	....	4¼x5½	36x4	36x7	W
Service, 71	3½	....	4¼x5½	36x5	36x5d	W
Service, 76	3½	....	4½x6	36x5	36x5d	W
Service, 101	5	....	4½x6	36x6	40x6d	W
Signal, NF	1	1950	4¾x5	34x5†	36x6†	W
Signal, H	1½	$2450	4¼x5¼	34x4	36x6	W
Signal, J	2½	2875	4½x5¼	34x4	36x8	W
Signal, M	3½	3675	4½x5½	36x5	40x5d	W
Signal, R	5	4400	4¾x6	36x6	40x6d	W
Southern, 10	1	2090	3¾x5	34x3½	34x4	W
Southern, 15	1½	2590	3¾x5½	36x6†	34x4	W
Southern, 20	2	2990	4¾x5¼	36x6†	40x8*	W
Standard, 1-K	1½	1600	3¾x5	34x3½*	34x5*	W
Standard, 76	2½-3	2400	4¼x5¼	36x4*	36x7*	W
Standard, 66	3½-5	3150	4½x5½	36x5	36x10	W
Standard, 5-K	5-7	4400	4¾x6	36x6	40x12	W
Sterling, 1½	1½	2885	4 x5¾	36x3½	36x5*	W
Sterling, 2	2	3085	4 x5¾	36x4	36x6*	W
Sterling, 2½	2½	3290	4¾x5¾	36x4*	36x4d*	W
Sterling, 3½	3½	4325	4½x6¼	36x5*	40x5d*	W
Sterling, 5-W	5	4950	5 x6¼	36x6*	40x6d*	W
Sterling, 5-C	5	5500	5 x6¼	36x6	40x6d	C
Sterling, 7½	7½	6000	5 x6¼	36x6	40x7d	C
Stewart, 14	¾	1195	3½x5½	32x4½†	32x4½†	I
Stewart, 15	1	1395	3½x5½	35x5†	35x5†	I
Stewart, 9	1½	1790	3¾x5	34x3½	34x5	I
Stewart, 7	2	2090	4¼x5¼	34x4	34x7	I
Stewart, 7-X	2½	2290	4¼x5½	34x4	34x7	I
Stewart, 10	3½	3090	4½x5½	36x5	36x5d	I
Stewart, 10-X	3½	3850	4½x6	36x5	36x5d	I
Stoughton, C	¾	1240	3½x5	34x4½†	34x4½†	W
Stoughton, A	1	1995	3¾x5¼	34x4½†	35x5†	W
Stoughton, B	1½	2350	3¾x5¼	36x3½	36x5	W
Stoughton, D	2	2800	4 x5½	36x4	36x7	W
Stoughton, F	3	3600	4¼x5½	36x5d	36x5d	W
Sullivan, E	2	2800	4¼x5½	36x4*	36x7*	W
Sullivan, H	3½	3750	4½x6	36x5	36x5d	W
Superior, D	1	1650	3¾x5	34x4½†	34x4	I
Superior, E	2	2600	4¼x5¼	36x4	36x6	I
Super Truck, 50	2½	3300	4 x6	36x4	36x8	W
Super Truck, 70	3½	4300	4¼x6	36x5	40x5d	W
Super Truck, 100	5	5300	4¾x6	36x5	40x12	W
Super Truck, 150	7½	6300	5 x6	36x6	40x7d	W
Texan, A38	¾	1095	3½x5	33x4	33x4	I
Texan, TK39	1½	1550	3½x5	36x6	38x7	W
Tiffin, GW	1½	2100	4½x5¼	36x3½	36x5	W
Tiffin, MW	2½	2700	4½x5¼	36x4	36x3½d	W
Tiffin, PW	3½	3600	4½x5½	36x5	40x5d	W
Tiffin, F50	5	4300	4¾x6	36x6	40x6d	W
Tiffin, F60	6	4500	4¾x6	36x6	40x12	W
Titan	2	2950	4x5½	34x4*	36x7	I
Titan	3½	3950	4¼x5¾	36x5	40x10	I
Titan	5	4550	4½x6	36x5	40x6d	I
Titan, 6-Ton	6	5150	4½x6	36x5	40x12	I
Tower, J	1½	2900	4½x5¼	35x5	38x7	W
Tower, H	2½	3200	4½x5¼	36x4	36x7	W
Tower, G	3½	4100	4½x5½	36x5	36x5d	W
Traffic, C	....	1595	3¾x5	34x3½*	34x5*	I
Traffic	3	1895	3¾x5	36x4	36x7	I
Transport, 20	1	1395	3¾x5½	34x3½	34x4	I
Transport, 30	1½	1995	3¾x5	36x3½	36x5	I
Transport, 50	2½	2785	4¼x5½	36x4	36x7	I
Transport, 70	3½	3885	4½x6	36x5	36x10	I
Traylor, B	1½	2390	3¾x5½	34x3½	34x5	W
Traylor, C	2	2850	4 x5½	36x4	36x7	W
Traylor, D	3	3300	4¼x5½	36x4	36x8*	W
Traylor, E	4	4450	4½x6	35x5	40x10	W
Traylor, F	5	4700	4½x6	36x6	40x6d	W
Triangle, AA	¾-1	1385	3¼x5	34x4½†	34x4½†	I
Triangle, A	1½	2350	3¾x5¼	34x3½*	34x6*	I
Triangle, C	2	2700	3¾x5¼	36x4*	36x6*	I
Triangle, B	2½	2950	4 x5¾	36x4*	36x7*	I
Triumph, G	1	1995	3½x5⅛	34x5†	34x5†	W
Triumph, HC	1½	2550	3¾x5¼	36x3½	36x5	W
Triumph, HB	2	2900	3¾x5¼	36x4	36x7	W
Twin City, B.W.	2	2750	4 x5½	36x4	36x7	I
Twin City, A.W.	3½	3950	4¼x6	36x5	40x5d	W
[4]Twin City, B	3½	....	5½x6	36x6	36x6	I
[4]Twin City, A	5	....	5½x6	36x7	36x7	I
Ultimate, A	2	3200	4 x5½	36x3½	36x6	W
Ultimate, AJ	2	3250	4¼x5½	36x3½	36x6	W
Ultimate, AJL	2	3300	4¼x5½	36x3½	36x6	W
Ultimate, B	3	3750	4½x5½	36x4	36x4d	W
Ultimate, BL	3	3850	4¼x5½	36x4	36x4d	W
Ultimate, D	5	5500	5 x6½	36x6	40x12	W
Union, FW	2½	3490	4 x6	36x5*	36x8*	D
Union, HW	4	4485	4½x6	36x6	40x12	D
Union, JW	6	5800	5 x6	36x6	40x14	D
United, A	1½	2445	3¾x5¼	36x3½*	34x5*	I
United, B	2½	3150	4¼x5½	36x4*	36x7*	I
United, C	3½	3975	4¼x5½	36x5	36x5d	I
United, V	5	4500	4½x6	36x6	40x6d	I
United States, U	1	1875	3½x5⅛	34x5†	34x5†	B
United States,NW	1½	2225	3¾x5	36x5	36x3½	W
United States, N	1½	1975	3¾x5	36x3½*	36x5*	I
United States, R	3	3075	4 x5¼	36x4	36x4d	W
United States, S	4	3875	4½x5½	36x5	36x5d	W
United States, T	6	4850	4¾x6½	36x6	40x6d	W
Velie, 46	1½	1585	3¾x5	36x3½	36x5	I
Veteran, M**	1½	2699	3¾x5¼	35x5†	35x5†	W
Veteran, P**	2	3699	4¼x5½	36x4	36x7	W
Veteran, R**	3	4200	4¼x5½	36x4	36x7	W
Veteran, S**	4	5395	4¼x6	36x5	36x10	W
Vim, 29	½	1050	3½x4½	31x4†	31x4†	W
Vim, 30	½	1175	3½x4½	32x4½	32x4½	W
Vim, 31	1	1975	3¾x5⅛	35x5†	35x5†	W
Vim, 22	2	3150	3¾x5½	36x4	36x6	W
Vim, 23	3	3050	4¼x5½	36x5	36x5d	W
Vulcan, 25	2½	4000	4¼x6	36x4	36x8	W
Vulcan, 25P	3	4500	4¼x6	36x6	40x8	W
Walker-JohnsonA	2	2500	3¾x5	34x5	38x7	W
Walker-Johnson,B	3	3500	4¼x5½	36x4	36x8	W

*2-cyl †6-cyl. ‡8-cyl. All others, not marked, are 4-cyl. Trac., Tractor. **Canadian made.

Final Drive: W—Worm. I—Internal Gear, C—Chains, D—Double Reduction, B—Bevel, 4—Four-Wheel, E—External Gear. *Tires—optional. †Pneumatic Tires. All others solid. ††Price includes body. §—Price includes several items of equipment.

2—Kelly-Springfield. 3—Nelson Le Moon. 4—Twin City Four Wheel Drive.

Specifications of Current Motor Truck Models—Continued

NAME AND MODEL	Tons Capacity	Chassis Price	Bore and Stroke	TIRES Front	TIRES Rear	Final Drive
Walter, S	5	$4850	4½x6¼	36x6	40x6d	W
Ward-LaF., 2B	2½	2990	4⅜x5¾	36x4	36x4d	W
Ward-LaF., 4A	3½	3990	4½x6¼	36x5	36x5d	W
Ward-LaF., 5A	5	4590	5 x6¼	36x6	40x6d	W
Watson, B	1	1685	3¾x5¼	35x5†	35x5†	W
Watson, N	3½	3825	4½x5½	36x5	36x10	W
Western, W1½	1½	2550	4½x5¼	36x3½*	36x5*	W
Western, L1½	1½	2550	3¾x5	36x3½*	36x5*	W
Western, W2½	2½	3250	4½x5¼	36x4	36x7	W
Western, L2½	2½	3250	4¼x6	36x4	36x7	W
Western, W3½	3½	4250	4½x6	36x5	40x5d	W
White, 15	¾	2400	3¾x5½	34x5†	34x5†	B
White, 20	2	3250	3¾x5½	36x4*	36x7	D
White, 40	3½	4200	3¾x5¾	36x5	40x5d	D
White, 45	5	4500	4¼x5¾	36x6	40x6d	D
White Hick., E	1	1225	3¾x5	34x5†	34x5†	W
White Hick., H	1½	1375	3¾x5	36x3½	36x5	W
White Hick., K	2½	1675	4½x5¼	36x4	36x5	W
Wichita, K	1	2000	3¾x5¼	36x3*	36x4*	W
Wichita, M	2	2500	3¾x5¼	36x3½*	36x6*	W
Wichita, RX	3	$3500	4¾x5¾	36x4*	36x8*	W
Wichita, O	4	3900	4½x6¼	36x5*	36x5d*	W
Wilcox, AA	1	1900	3¼x5½	36x4*	36x4*	W
Wilcox, BB	1½	2550	4¼x5	36x4	36x5	W
Wilcox, D	2½	3000	4¼x5	36x4*	36x3½d*	W
Wilcox, E	3½	3950	4½x6	36x5*	36x5d*	W
Wilcox, F	5	4350	4¾x6½	36x5	40x6d	W
Wilson, F	1½	2270	3¾x5	36x3½	36x5	W
Wilson, EA	2½	2825	4½x5¼	36x4	36x7	W
Wilson, G	3½	3685	4½x5½	36x5	36x5	W
Wilson, H	5	4520	4¾x6	36x6	40x6	W
Winther, 751	1	1795	3½x5	34x4½†	35x5	I
Winther, 430	1½	$2850	3¾x5	32x4	32x4	I
Winther, 39	1½	2450	3¾x5	34x3½	34x5	I
Winther, 49	2	3250	4 x5	34x4	34x4d	I
Winther, 50	2½	3995	4 x6	38x7†	42x9†	I
Winther, 70	3½	4200	4 x6	36x5	36x5d	I
Winther, 450	2½	3690	4 x5	34x5	36x6	I
Winther, 109	5	5250	4½x6	36x6	40x5d	I
Winther, 140	7	5900	5 x6	36x6	40x7d	I
Wisconsin, B	1	1750	3¾x5	34x5†	34x5†	W
Wisconsin, C	1½	2500	4 x5¾	36x6	36x6	W
Wisconsin, F	2	3000	4⅜x5¾	38x7	40x8	..
Wisconsin, D	2½	3500	4½x6¼	36x6	36x10	W
Wisconsin, C	3½	4000	5 x6¼	36x6	36x12	W
Witt-Will, N	1½	2250	3¾x5	36x3½*	36x5*	W
Witt-Will, P	2½	2750	4½x5¼	36x3½*	36x7*	W
Wolverine, J	1	2125	3½x5	34x3	34x4	I
Wolverine, J	1½	2375	3¾x5	34x3½	34x5	I
Wolverine, J	2	2640	3¾x5	34x4	34x7	I
Wolverine, J	2½	3425	4½x5¼	36x5	36x10	I
Wolverine, L	3½	4100	4½x5½	36x5	36x10	I

*2-cyl. †6-cyl. ‡8-cyl. All others, not marked, are 4-cyl. Trac., Tractor. **Canadian made.

Final Drive: W—Worm, I—Internal Gear, C—Chains, D—Double Reduction, B—Bevel, 4—Four-Wheel, E—External Gear. *Tires—optional. †Pneumatic Tires. All others solid. ††Price includes body. §—Price includes several items of equipment.

Farm Tractor Specifications and Prices

TRADE NAME	Rating	Price	Wheels or Crawlers	Engine	Cylinders: Bore, Stroke	Fuel	Plow Capacity
All-In One	15-30	$1975	3	Weid.	4-4 x5½	GDK	2-3
Allis-Chalm. B	6-12	925	2	LeR.	4-3½x4½	Gas.	1
Allis-Chal.G.P	14-27	795	2	Midw.	4-4½x5¼	Gas.	3
Allis-Chalm.	18-30	2150	4	Own	4-4¾x6½	GorK	3-4
Allis-Chalm.	22-38	875	4	Own	4-4¾x6½	G,K	4
Allwork 2-G	14-28	1775	4	Own	4-4¾x6	GorK	3
Allwork C	14-28	1525	4	Own	4-5 x6	GorK	3
AndrewsKin.D	18-36	2400	4	Clim.	4-5 x6½	GorK	4
Appleton	12-20	1500	4	Buda	4-4¼x5½	G,K	2-3
ARO 1921-22	3-5	495	4	Own	1-4½x5	Gas.	1
Aultman-T.	15-30	2200	4	Clim.	4-5 x6½	G,K	4
Aultman-T.	22-45	3420	4	Own	4-5½x8	G,K	6
Aultman-T.	30-60	4500	4	Own	4-7 x9	G,K,D	8-10
Automot. B-3	12-24	1785	4	Herc.	4-4 x5½	Gas.	2-3
Avery,SR.Cul.	5-10	....	4	Own	4-3 x4	G,K	..
Avery Cult-C	....	....	3	Own	6-3 x4	G,K	..
Avery B	5-10	....	4	Own	4-3 x4	G,K	2
Avery C	....	....	4	Own	6-3 x4	G,K	..
Avery	8-16	....	4	Own	2-5½x6	G,K,D	2-3
Avery	12-20	....	4	Own	4-4½x6	G,K,D	3-4
Avery	....	....	*	Own	4-4x5½	G,K,D	3
Avery	12-25	....	4	Own	2-6½x7	G,K,D	3-4
Avery	14-28	....	4	Own	4-4½	G,K,D	3-4
Avery	18-36	....	4	Own	4-5½x6	G,K,D	4-5
Avery	25-50	....	4	Own	4-6½x7	G,K,D	5-6
Avery	45-65	....	4	Own	4-7¾x8	G,K,D	8-10
Bates	15-25	....	4	Own	4-4¼x6	Ker.	3
Bates Mule H	15-25	....	4	Midw	4-4½x5¼	Gas.	3
Bates Mule, F	18-25	....	*2	Midw	4-4½x5¼	Gas.	3
Bates Mule, G	25-35	....	*2	Midw	4-4½x6	Gas.	com.
Beeman, G	2-4	315	4	Own	1-3½x4½	Gas.	....
Best	18-30	3100	*2	Own	4-4¾x6½	G,K,D	4
Best	60	5450	*2	Own	4-6½x8½	G,K,D	8-9
Bering 1921	....	1850	3	Wauk	4-4⅝x5¾	GorK	2
Burn-Oil, 1922	15-30	1495	4	Own	2-6¼x7	Ker.	3-4
Capital	15-30	1000	2	Own	4-4¼x6	Gas.	3
Case	10-18	800	4	Own	4-3⅞x5	GorK	2
Case	15-27	1680	4	Own	4-4½x6	GorK	3-4
Case	22-40	3100	4	Own	4-5½x6¾	GorK	4-5
Caterpillar T11	25	3975	*2	Own	4-4¾x6	Gas.	4
Caterpillar T16	40	6050	*2	Own	4-6½x7	Gas.	6
Centaur	5-2½	385	2	N Way	2-4½x4½	GorK	1
Chase	12-25	1725	3	Buda	4-4½x5½	GorK	2-3
Chicago	40	2500	4	Own	4-4½x6	Gas.	4
Cletrac F	9-16	795	*2	Own	4-3¼x4½	G,K,D	2
Cletrac W	12-20	1345	*2	Own	4-4 x5½	G,K,D	2-3
Dakota 4	15-27	1500	3	Dom.	4-4¾x6	Gas.	3
Dart B.J.	15-30	1800	4	Buda	4-4½x6	Gas.	3-4
Depue A	20-30	2500	4	Buda	4-4½x6	Gas.	4
Dill D	20	2380	4	Cont.	4-4½x5½	Gas.	3
Dill R.W.	20	2980	4	Midw.	4-4½x6	Gas.	3
Do-It-All A	3-6	595	..	Own	1-4½x5	Gas.	1
Eagle F	12-22	....	4	Own	2-7 x8	GorK	3-4
Eagle F	16-30	....	4	Own	2-8 x8	GorK	4-5
E-B AA	12-20	1445	4	Own	4-4¾x5	G,K,D	3
E-B Q	12-20	925	4	Own	4-4¾x5	G,K,D	3
E-B	16-32	2080	4	Own	4-5¼x7	G,K,D	4
Evans	18-30	2000	4	Buda	4-4½x6	G,K	3
Fageol D	9-18	1525	4	Lyc.	4-3½x5	Gas.	2
Farm Horse B	18-30	1885	4	Clim.	4-5 x6½	G,K	4
Farquhar	15-25	....	4	Buda	4-4½x6	G,K,D	3-4
Farquhar	18-35	....	4	Own	4-6 x8	G,K,D	4-5
Farquhar	25-50	....	4	Own	4-7 x8	G,K,D	6-7
Fitch 4	20-35	....	4	Clim.	4-5 x6½	GorK	3-4
Flour City	20-35	....	4	Own	4-5¼x6	Ker.	4-6
Flour City	30-50	....	4	Own	4-6¾x7	Ker.	6-8
Flour City	40-70	....	4	Own	4-7½x9	Ker.	8-10
Fordson	-18	395	4	Own	4-4x5	G,K	2
Fox E	20-40	3100	4	Own	4-5½x7½	G or K	4
Franklin G	18-30	4000	*2	Clim.	4-5 x6½	G or K	3-4
Franklin C	18-30	3350	*2	Clim.	4-5 x6½	G or K	3-4
Franklin G2	18-30	4350	2	Clim.	4-5 x6½	G or K	3-4
Frick A	12-20	....	4	Erd.	4-4 x6	G,K	2-3
Frick C	15-28	....	4	Beav.	4-4¾x6	G,K	3-4
Grain Belt A	18-36	$2150	4	Wauk.	4-4¾x6¾	G or K	4
Gray 1920	18-36	2000	3	Wauk	4-4¾x6¾	Gas.	4
Ground Hog	19-31	2000	4	Erd.	4-4 x6	G or K	3
Gt. Western St	20-30	1950	4	Beav.	4-4¾x6	K	4
Hart-Parr 20	20	945	4	Own	2-5¼x6½	K,D.	2
Hart-Parr 30	30	1295	4	Own	2-6½x7	K,D.	3
Heider D	9-16	870	4	Wauk	4-4¼x5¾	G,K	2
Heider C	12-20	995	4	Wauk	4-4½x6¾	G,K	3
Heider Cult	6-10	1050	4	LeR.	4-3½x4½	Gas.	1
Hicks	20-30	....	4	....	4-4½x6	K or G	4
Huber Light 4	12-25	1185	4	Wauk	4-4½x5¾	G or K	3
Huber Super 4	15-30	1885	4	Midw.	4-4½x6	Gas	3
Illinois, Super-Drive C	15-30	....	4	Clim.	4-5 x6½	G,K	4
Imperial E	40-70	4500	4	Own	4-7½x9	G,K,D	10
Indiana F	5-10	895	2	LeR.	4-3½x4½	Gas.	1-2
International	8-16	†870	4	Own	4-4¼x5	G,K,D	2
Internatl.Titan	10-20	†700	4	Own	4-5¼x8	G,K,D	4
International	15-30	1500	2	Own	4-4½x6	G,K,D	3
J-T N	20-40	....	*2	Chief.	4-4¾x6	G,K,D	3-4
Klumb F	18-32	1475	4	Clim.	4-5 x6½	....	..
Knudsen 1920	25-45	2500	4	Own	4-5½x9	Gas	4-6
LaCrosse M	6-12	650	4	Own	2-4 x6	G,K	1
LaCrosse G	12-24	985	4	Own	2-6 x7	G or K	3
Lauson 5	12-25	1495	4	Midw.	4-4½x5¼	Gas.	3
Lauson 20	15-25	1685	4	Beav.	4-4½x6	G or K	3-4
Lauson 21	15-30	1985	4	Beav.	4-4¾x6	G or K	3-4
Lauson Read	15-30	2225	4	Beav.	4-4¾x6	K	....
Leader B	12-18	1095	4	Own	2-6 x6½	G,K,D	2-3
Leader M	16-32	1985	4	Clim.	4-5 x6½	G,K	3-4
Leader GU	18-36	2775	*2	Clim.	4-5 x6½	G,K	3-4
Leonard E	20-30	2530	4	Buda	4-4½x6	G,K	3
Linn H4J	40-	4500	*	Cont.	4-4½x5½	Gas	4
Linn W	60	5100	*	Wauk	4-5 x6¼	Gas	6
Little Giant, B	16-22	2200	4	Own	4-4½x5	K	4
Little Giant, A	26-35	3300	4	Own	4-5½x6	K	6
Lombard 1921	85-150	....	*2	....	6-5½x6¾	Gas.	16
Lombard 1921	50	....	*2	....	4-4¾x6½	....	6-10
Magnet B	14-28	1875	4	Wauk	4-4½x6¼	K&G	3
Master Jr.	5-10	585	.	LeR.	-2¾x4	Gas.	1
MerryGar1921	2	230	2	Evin	1-2½x2½	Gas.	..
Minne. All-P	12-25	900	4	Own	4-4½x7	G or K	3
Minne. Gen.P	17-30	1675	4	Own	4-4¾x7	G or K	3-4
Minne. Med.Duty	22-44	3000	4	Own	4-6 x7	G or K	5-6
Minne. HeavyDuty	35-70	4150	4	Own	4-7¼x9	G or K	8-9
Mohawk 1921	8-16	785	2	Light	4-3¼x4½	K or G	1-2
Moline Univ D	9-18	990	2	Own	4-3½x5	Gas.	2-3
Moline Orch.	9-18	1075	2	Own	4-3½x5	Gas.	2-3
Motor Macult.	1½	195	2	Own	1-2¾x3½	Gas.	..
Motox	15-30	2250	4	Buda	4-4½x6	Gas.	3-4
NB 1	3-6	425	4	Own	2-3¾x4	Gas.	1
Nichols-Shep. 20-42	20-42	3100	4	Own	8 x10	G or K	3-6
Nichols Shep. 25-50	25-50	3460	4	Own	9 x12	G or K	4-7
Nilson Senior	20-40	2475	5	Wauk	4-5 x6¼	G,K	4
Oil Pull K	12-20	1485	4	Own	2-6 x8	K,D	3
Oil Pull H	16-30	2285	4	Own	2-7 x8½	K,D	4
Oil Pull G	20-40	3175	4	Own	2-8 x10	K,D	5-6
Oil Pull E	30-60	4590	4	Own	2-10x12	K,D	8-10
Oldamar GarK	2½-5	395	4	Own	1-5½x5½	Gas.	1
Oliver A	15-30	....	*2	Beav.	4-4½x6	G or K	3-4
Once Over Tiller Mark 6	12-25	3000	4	Strns	4-4½x6	Gas.	2
Parrett K	15-30	1950	4	Pitt	4-4½x6	G,K	3
Peoria L	12-25	1600	4	Clim.	4-5 x6½	G,K	3
Pioneer G	20-40	....	4	Own	4-5½x6	G,K,D	4
Pioneer C	40-75	....	4	Own	4-7 x8	Gas.	10
Plowman A	15-30	1695	4	Buda	4-4½x6	G,K	3-4
Port Huron A	12-25	$1500	4	Chief	4-3¾x6	G,K	3
Ranger Cul. T-20	8-16	....	4	LeR.	4-3½x4½	Gas.	1
Reed A	15-30	1985	4	Wauk	4-4½x6¼	G or K	3-4
Reed A-1	18-36	2185	4	Wauk	4-5 x6¼	Gas.	4
Reliable	10-20	885	4	Own	2-6 x7	Ker.	2
Rex	12-25	1600	4	Wauk	4-4¼x5¾	G or K	3
Russell	12-24	1500	4	Own	4-4¼x5¾	G or K	2-3
Russell	15-30	2200	4	Own	4-5 x6½	G or K	3-4
Russell	20-35	3000	4	Own	4-5½x7	G or K	4-5
Russell	30-60	5000	4	Own	4-8 x10	G or K	8-10
Samson M	....	445	4	Own	4-4 x5½	G,K	2
Sandusky, J	10-20	1250	4	Own	4-4¼x5¼	G,K,D	2
Sandusky E	15-35	1750	4	Own	4-5 x6½	G,K,D	4
Shawnee Com.	6-12	....	2	LeR.	4-3½x4½	Gas.	1
Shawnee Com.	9-18	....	2	Gray	4-3½x5	....	..
Shelby D	15-30	....	4	Beav.	4-4¾x6	G,K	3
Shelby C	9-18	....	4	Wauk	4-3¾x5¼	G or K	2
Short Turn	20-40	1500	3	Beav.	4-4¾x6	G,K	3
Steady Pull	12-24	1485	4	Own	4-4 x5	Gas.	3
Stinson 4E	18-36	1835	4	Beav.	4-4¾x6	G,K	4
Stone	20-40	2250	4	Beav.	4-4½x6	G,K	4
Tioga 3	15-27	2625	4	Wisc.	4-4½x6	Gas.	3-4
Topp-Stewart B	30-45	3500	4	Wauk	4-4¾x6¾	Gas.	3-4
Toro Cultivator	6-10	....	3	LeR	4-3½x4½	Gas.	2
Townsend	10-20	895	2	Own	4-6½x7	Ker.	2-3
Townsend	15-30	1485	2	Own	4-7 x8	Ker.	3-4
Townsend	25-50	2750	2	Own	4-8½x10	Ker.	4-8
Traction Motor	40-50	....	4	....	8-3¼x5	Gas.	4-5
Traylor TB	6-12	715	4	LeR.	4-3½x4½	Gas.	1-2
Triumph H	18-36	2450	2	Erd.	4-4¾x6	Ker.	4
Trundaar 10	25-40	3750	*2	Wauk	4-5 x6¼	G or K	4
Turner 1921	14-25	1295	4	Buda	4-4¼x5½	G,K	3
Twin City	12-20	1580	4	Own	4-4¼x6	G,K	3
Twin City	20-35	3175	4	Own	4-5½x6¾	G,K	5
Twin City	40-65	5250	4	Own	4-7¾x9	G,K	8
Uncle Sam C20	12-20	1385	4	Weid.	4-4 x5½	G	2-3
Uncle Sam B19	20-30	2300	4	Beav.	4-4¾x6	G or K	3-4
Uncle Sam D21	20-30	1985	4	Beav.	4-4¾x6	G or K	3-4
Universal	1-4	475	2	Own	1-3½x5	G	1
Utilitor 501	2½-4	380	4	Own	1-3½x4½	G	1
Vim B	15-30	1650	4	Wauk	4-4½x5¾	G,K	3
Wallis K	15-25	†995	4	Own	4-4¼x5¾	G,K	3
Waterloo N	12-25	675	4	Own	2-6½x7	G,K	3
Webfoot 53	28-53	5000	*2	Wisc.	4-5¾x7	G,D	6
Wellington B	12-22	....	4	Erd	4-4 x6	Ker.	2-3
Wellington F	16-30	....	4	Chief	4-4¾x6	Ker.	3-4
Western, 1920	16-32	2100	4	Clim.	4-5 x6½	Gas.	4
Wetmore 21-22	12-25	1585	4	Wauk	4-4 x5¾	G,K	3
Whitney D	9-18	595	4	Own	2-5½x6½	Gas.	2
Wichita T	15-30	2000	4	Beav.	4-4½x6	G,K,D	3-4
Wisconsin E	16-30	2250	4	Clim.	4-5 x6½	G or K	3
Wisconsin F	20-40	2450	4	Wauk	4-5 x6¼	G or K	4
Wisconsin, H	22-40	3200	4	Clim.	4-5½x7	G or K	4-6
Yuba 12-20	12-20	2600	*2	Wisc.	4-4½x6¾	G,K,D	3
Yuba 15-25	15-25	3100	*2	Wisc.	4-4¼x6	G,K,D	..
Yuba 20-35	20-35	4185	*2	Wisc.	4-5¾x7	G,K,D	4
Yuba 25-40	25-40	4650	*2	Wisc.	4-5¾x7	G,K,D	..
Zelle	12-25	....	4	Buda	4-4¼x5½	G or K	3

ABBREVIATIONS: G—Gasoline. K—Kerosene. D—Distillate. Plow capacity varies in relation to operating conditions. Figures are based on 14 in. plows. Engine Make: Beav.—Beaver. Clim.—Climax. Cont.—Continental. Dom.—Domas. Evin.—Evinrude. Herc.—Hercules. LeR.—LeRoy. Midw.—Midwest. Nway.—New Way. Nor.—Northway. Strns.—Stearns. T.C.—Twin City. Wauk.—Waukesha. Weid.—Weidely. Wis.—Wisconsin. *—Crawler type. All others are wheel type. †Price includes plows.

COMING MOTOR EVENTS

AUTOMOBILE SHOWS

Montreal	Automobile Show	Feb. 25-Mar. 4
Des Moines	Winter Automobile Show	Feb. 26-Mar. 3
Bethlehem, Pa.	Truck and Tractor Show	Feb. 27-28
Amsterdam, N. Y.	Automobile Show	Feb. 27-Mar. 4
Bridgeport, Conn.	Automobile Show	Feb. 27-Mar. 4
Glen Falls, N. Y.	Automobile Show	Feb. 27-Mar. 4
Elmira, N. Y.	Elmira Automobile Club	Feb. 27-Mar. 4
Jamestown, N.Y.	Automobile Show	Feb. 27-Mar. 4
Muskegon, Mich.	Michigan Automotive Trade Assn.	Feb. 27-Mar. 4
Paterson, N. J.	Automobile Show	Feb. 27-Mar. 4
Portland, Me.	Portland Dealers' Assn.	Feb. 27-Mar. 4
Springfield, Mass.	7th Annual Automobile Show	Feb. 27-Mar. 4
Windsor, Ont.	Automobile Show	Feb. 27-Mar. 4
Bay City, Mich.	Michigan Automotive Trade Assn.	Feb. 28-Mar. 4
Wichita, Kan.	Wichita Motor Trade Assn.	Feb. 28-Mar. 4
Harrisburg, Pa.	Automobile Show	March
Ardmore, Okla.	Ardmore Automobile Dealers' Assn.	March
Madison, Wis.	Automobile Show	March
San Antonio	Automobile Trades Assn.	March
Evansville, Ind.	Eighth Annual Automobile Show	Mar. 1- 4
Asheville, N. C.	Automobile Show	Mar. 2-4
Youngstown	Youngstown Dealers' Assn.	Mar. 4-11
Brooklyn	Eleventh Annual Show	Mar. 4-11
Saginaw, Mich.	Michigan Automotive Trade Assn.	Mar. 6-10
Camden, N. J.	Automobile Trade Assn.	Mar. 6-11
Indianapolis	Annual Automobile Show	Mar. 6-11
Nashville	Nashville Automobile Trades Assn.	Mar. 6-11
Yonkers, N. Y.	Automobile Show	Mar. 6-11
Wilmington, Del.	Wilmington Trade Assn.	Mar. 6-13
Fairmont, W. Va.	Automobile Show	Mar. 7-10
Newburgh, N. Y.	Automobile Show	Mar. 8-11
Rockford, Ill.	Automobile Show	Mar. 8-11
Amarillo, Tex.	Automobile Show	Mar. 10-11
Antigo, Wis.	Automobile Show	Mar. 10-12
Denver	Denver Automobile Trade Assn.	Mar. 10-20
Boston	Annual Automobile Show	Mar. 11-18
Newark, N. J.	Newark Automobile Dealers' Assn.	Mar. 11-18
Spartanburg, S. C.	Piedmont Exposition	Mar. 13-18
Boston	Automobile Salon	Mar. 13-18
Omaha	Omaha Automobile Trade Assn.	Mar. 13-18
Great Falls, Mont.	Automobile Show	Mar. 13-18
Greensboro, N. C.	Automobile Show	Feb. 14-18
Port Huron, Mich.	Michigan Automotive Trade Assn.	Mar. 15-18
Logansport, Ind.	Automobile Show	Mar. 16-18
Torrington, Conn.	Automobile Show	Mar. 20-25
White Plains, N.Y.	Automobile Show	Mar. 20-25
Ypsilanti, Mich.	Michigan Automotive Trade Assn.	Mar. 21-22
Denver, Colo.	Automobile Show	Mar. 22-25
Herkimer, N. Y.	Automobile Show	Mar. 23-25
Kingston, N. Y.	Automobile Show	Mar. 23-25
Ann Arbor, Mich.	Michigan Automotive Trade Assn.	Mar. 24-25
Wash'ton, City of.	Automobile Trade Assn.	Mar. 25-Apr. 1
Jacksonville, Ill.	Automobile Show	Mar. 27
Oklahoma City	Automobile Show	Mar. 27-Apr. 1
Torrington, Conn.	Automobile Show	Mar. 27-Apr. 1
Ben. Harb., Mich.	Michigan Automotive Trade Assn.	Mar. 28-31
Quincy, Ill.	Automobile Show	Mar. 28-Apr. 1
Bridgeport, N. J.	Automobile Show	Apr. 1- 8
Bat. Creek, Mich.	Michigan Automotive Trade Assn.	Apr. 2- 8
New York City	Electric Automobile Show	Apr. 3-15
Buffalo, N. Y.	Motors and Sportsmen's Show	Apr. 10-15
Wins.-Salem, N. C.	Automobile Show	Apr. 11-17
Goldsboro, N. C.	Automobile Show	Apr. 18-22
Chicago	Used Car Show	Apr. 26-May 4
Hartford, Conn.	Automobile Show	Sept. 4- 9

FOREIGN SHOWS

London, England	Automobile Show	Feb. 6-11
Santiago, Cuba	Annual Automobile Show	March, 1922
Mexico City	Automobile Show	Apr. 16-23
Rio de Janeiro	Automotive Exhibition	Sept., 1922

CONVENTIONS

Wichita, Kans.	Threshermen's Convention	Feb. 21-24
Decatur, Ill.	3rd Annual Convention, Illinois Automotive Trade Assn.	Mar. 20
Olympia	Washington Automotive Trade Assn.	July 21-22

RACES

Indianapolis	500-Mile Classic	May 30
San Carlos, Cal.	500-Mile Armistice Day Race	Nov. 11

BUYING STRONG AT LOUISVILLE'S 14TH ANNUAL SHOW

Exhibitors in the fourteenth annual exhibit of the Louisville Automotive Dealers' Association were highly elated over the large attendance of the opening day, and commented freely on the favorable attitude which was manifested by the visitors toward the new models and the low prices that are being quoted on the cars. The buying started almost immediately after the doors were thrown open and sales were reported at many booths the first evening. Fifty-seven cars had been sold when the show was half over. Approximately 250 passenger cars were exhibited by 38 representatives.

SPACE DRAWN AT QUINCY

Quincy, Ill., Feb. 27—Space has been drawn and assignments made for the Quincy Auto Trades Assn. show, which opens March 29. It has been decided to continue the show through Sunday night to reach those who may not have opportunity to visit the display during the week end. Commendation of the Illinois highway commission's road program was given and resolutions with this sentiment dispatched to Governor Small and State Highway Engineer C. E. Olden.

Louisville's 14th Annual Show

WHEELING SHOW REPORT

Huntington, W. Va., Feb. 27—Thirty-two makes of cars were shown at the show here from the lowest to the highest priced models. All attendance and sales records were broken at the show. Especially in the low-priced cars, dealers say, sales were good and indications of later sales were fine. Closed types of cars attracted much attention.